AVIATION WEEK

SEPT. 8, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A McGRAW-HILL PUBLICATION

FOR AIRCRAFT ENGINES . . . AIRCRAFT SPARK PLUGS

PUBLIC LIBRARY
SEP 8 1947
DETROIT

AMERICAN AIRLINES

chooses BG *Spark Plugs Exclusively*

FOR ITS NEW DC 6's

Night and day, from coast to coast and from the Great Lakes to Mexico City, BG ceramic insulated plugs power the mighty engines of American's new DC 6's. Winging from earth to 20,000 feet in a few minutes, traveling through the skies at 300 miles an hour—these plugs must stand up to conditions entirely new to scheduled operations. Dependability, superior performance, and long service life with minimum maintenance are the reasons why most of the world's airlines use BG ceramic insulated spark plugs.

Serving the airlines of the globe for thirty years.

THE BG CORPORATION

136 West 52nd Street, New York 19, N. Y.

MANUFACTURERS OF BOTH CERAMIC-INSULATED AND MICA-INSULATED AVIATION SPARK PLUGS

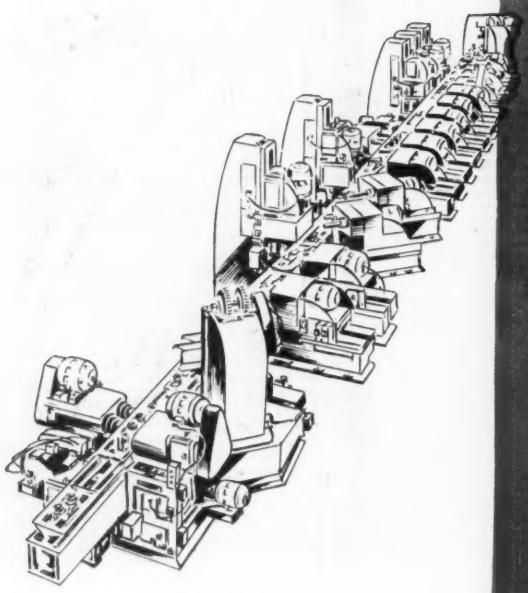
DETROIT PUB LIBRARY
TECHNOLOGY DPT
96 PUTNAM AV
DETROIT MICH

In More Than 30 Booths at the MACHINE TOOL SHOW...

YOU WILL SEE THE

Many Applications

OF VICKERS HYDRAULIC CONTROLS



Machine Tool Builders use Vickers Hydraulic Equipment to meet the ever increasing demand for Higher Production Rates, Reduced Parts Costs and Improved Product Quality

Vickers Hydraulic Controls have played a significant part in the development of many modern machine tools because they provide the designer with opportunities for improvement not available by other methods. From simple machine tools to completely automatic processing machines, Vickers Hydraulic Equipment makes good machines even better.

You can see the many advantages which Vickers Hydraulic Controls have contributed to modern machine tools in more than 30 booths at the Machine Tool Show—booths of machine tool builders who are displaying Vickers Hydraulic equipped machines of many types. It will be very much worth your while to inspect these machines.

To make it easy for you to find these exhibits, we have prepared a booklet illustrating the machines, listing the names of the manufacturers and showing their booth locations. Stop at Vickers Booth No. 228 for your copy.

BOOTH 228

Here you will see the latest developments in Vickers Hydraulic Controls. Vickers Application Engineers will be glad to discuss your individual problems.

VICKERS Incorporated

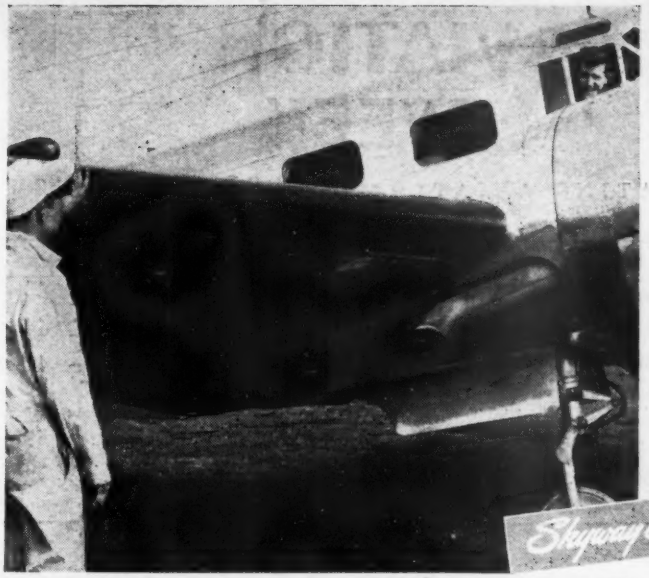
DIVISION OF THE SPERRY CORPORATION

1462 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Vickers Engineering Offices: ATLANTA • CHICAGO • CINCINNATI • CLEVELAND
DETROIT • LOS ANGELES • MIAMI • NEWARK • PHILADELPHIA • ROCKFORD
ROCHESTER • SEATTLE • ST. LOUIS • TULSA • WASHINGTON • WORCESTER

3241

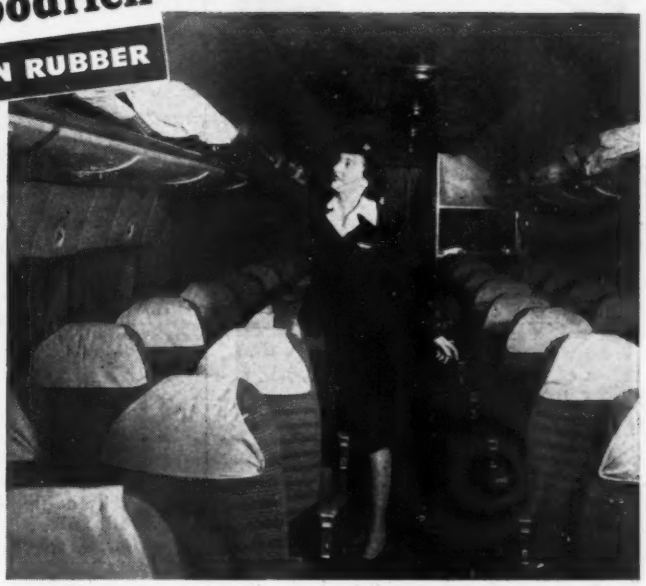
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921



Skyway or Highway

B.F. Goodrich

FIRST IN RUBBER



Rubber erases some old ideas about flying

FLYING used to be considered a "fair weather" proposition. During a good part of the year, icing conditions kept planes on the ground.

Then B. F. Goodrich engineers worked out a way to remove ice from wings and tail surfaces. Equipped with B. F. Goodrich De-Icers, airlines found they could operate all year 'round. And as a result, these rubber De-Icers now protect the wings and tails of almost every airliner and many smaller planes as well (photo upper left).

Today, B. F. Goodrich rubber is erasing other old ideas about flying too. The newest B. F. Goodrich tire is a good example. It's the smallest tire ever used on a plane's main wheels. Yet it lands a 10,000 pound load at the fastest speeds in air history!

B. F. Goodrich Expander Tube brakes combine with B. F. Goodrich tires, tubes and wheels to improve landings, take-offs and taxiing for all types of planes (photo upper right).

Added safety is provided by a new B. F. Goodrich product—electrically heated rubber. It keeps ice from forming on propellers, cowlings, water tanks, hydraulic lines, and other installations. And it has proved the most efficient way of getting the right amount of heat to a specific spot (photo lower left).

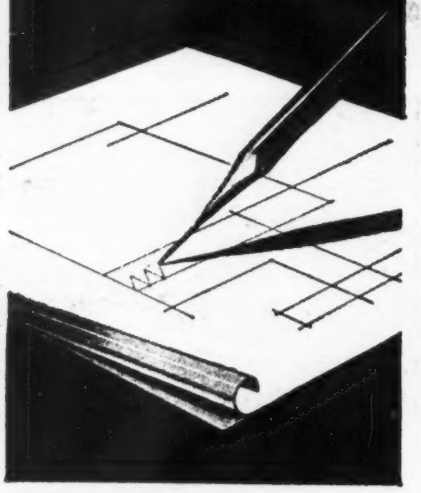
For comfortable, attractive, durable cabins, B. F. Goodrich supplies sponge rubber seats, cushioning flooring materials, and interior trim for ceilings, walls, arm rests, rugs and many other uses (photo lower right).

Many, many more B. F. Goodrich products are widely used on today's planes. And B. F. Goodrich is constantly working to develop new products to make planes ever better, cheaper and safer. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

TRACING CLOTH
for
HARD PENCILS



● Imperial Pencil Tracing Cloth has the same superbly uniform cloth foundation and transparency as the world famous Imperial Tracing Cloth. But it is distinguished by its special dull drawing surface, on which hard pencils can be used, giving clean, sharp, opaque, non-smudging lines.

Erasures are made easily, without damage. It gives sharp, contrasting prints of the finest lines. It resists the effects of time and wear, and does not become brittle or opaque.

Imperial Pencil Tracing Cloth is right for ink drawings as well.

IMPERIAL PENCIL TRACING CLOTH

SOLD BY LEADING STATIONERY AND DRAWING MATERIAL DEALERS EVERYWHERE

AVIATION WEEK

Vol. 47 No. 10 — Sept. 8, 1947

INCORPORATING AVIATION AND AVIATION NEWS

The Aviation Week	7	New Aviation Products	43
News Digest	8	Sales & Service	44
Headline News	11	Briefing for Dealers	47
Financial	18	World News	55
Engineering - Production	21	Transport	59
Industry Observer	25	Editorial	74

Robert H. Wood
EDITOR

John Foster, Jr.
EXECUTIVE EDITOR

Merlin H. Mickel
MANAGING EDITOR

Robert B. Hotz ..... News Editor
Irving Stone ..... Technical Editor
William Kroger ..... Production
Alexander McSurely ..... Sales & Service
Charles L. Adams ..... Transport Editor
Robert McLarren ..... Engineering
Albert E. Smyser, Jr. ..... Engineering
Scholer Bangs ..... Pacific Coast Editor
Katherine Johnsen ..... Congress
Herbert F. Powell ..... Special Assignment
Blaine Stubblefield ..... Special Assignment
Marie Adams ..... Editorial Assistant

Researchers, F. L. Peterson, V. Giaculli, A. L. Scaffo, W. D. Lanier

Executive and Editorial Offices: 330 W. 42nd St., New York 18, N. Y.; National Press Bldg., Washington 4, D. C.

Domestic News Bureaus: Atlanta 3, Rhodes Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S. Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, Salt Lake City and 43 other cities.

Foreign News Bureau: London, Paris, Berlin, Prague, Moscow, Shanghai, Bombay, Montreal, Ottawa, Mexico City, Buenos Aires, Correspondents in Berne, Caracas, Santiago, Pieping, Tokyo, Zurich, Rome and over 100 other cities.

ECONOMICS STAFF:
Dexter M. Keezer, Sanford S. Parker, William F. Butler, John D. Wilson

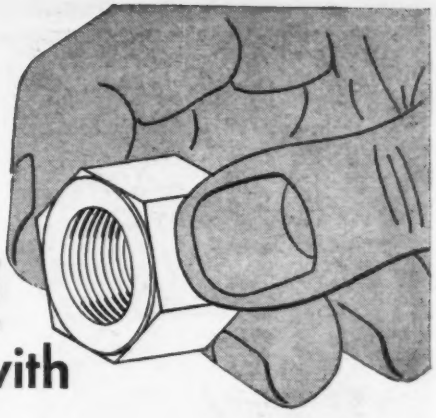
Robert F. Boger
PUBLISHER

J. C. Anthony
MANAGER

Business Manager, J. G. Johnson — *Art Director,* Henry L. Sandstrom

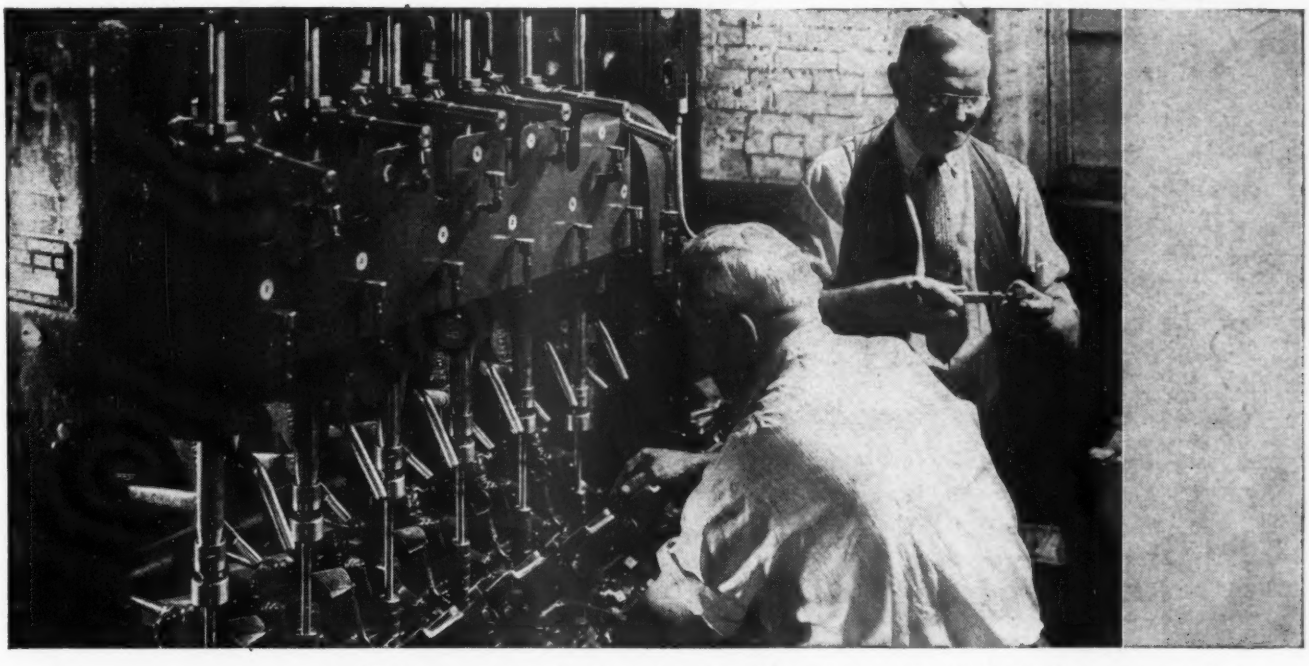
R. W. Martin, Jr., *Sales Manager;* M. J. Storz, New York; L. J. Biel, Philadelphia; V. K. Dissette, Cleveland; R. F. Greene, Detroit; A. B. Martin, Chicago; W. G. Ashmore, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, St. Louis, Boston and London.

McGRAW-HILL PUBLISHING CO., Inc., Publishing Office, 99-129 N. Broadway, Albany, N. Y. Return postage guaranteed. Editorial and executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 69 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes Haverty Bldg., Atlanta 3; 621 S. Hope St., Los Angeles 14; 738-9 Oliver Bldg., Pittsburgh 22. JAMES H. McGRAW, Founder and Honorary Chairman; JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to President; J. E. BLACKBURN, Jr., Director of Circulation . . . Aviation Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $5 a year $8 for 2 yr., $10 for 3 yr. Canada, $6 for 1 yr., $10 for 2 yr., $12 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 47, Number 10. Printed in U.S.A. Cable address, "McGraw-Hill New York." Member A.B.C. Copyright 1947, McGraw-Hill Publishing Co. Aviation Week is indexed in "Reader's Guide to Periodical Literature" and in "Industrial Arts Index." Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.



"We get better threads and save a washing operation with Gulf Cut-Aid"

says this Foreman



The Foreman is checking thread finish and size of a ¾-inch Hex nut tapped on this machine. Steel is X1112, free machining Bessemer Screw stock. (Photo courtesy of Corbin Screw Division, American Hardware Company, New Britain, Conn.)

"WE greatly improved the performance of our nut tappers by the use of Gulf Cut-Aid," says this Foreman. "We not only eliminated a washing operation — we're getting a better finish on the threads, and longer tap life."

Though it is generally recommended for machining nonferrous metals, scores of shops report that Gulf Cut-Aid is excellent for tapping low carbon steel nuts.

Call in a Gulf Lubrication Engineer today and let him help you find opportunities for greater production at lower cost through the use of Gulf quality cutting oils. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

Gulf Quality Cutting Oils

- Gulf Lasupar Cutting Oils A, B, and C
- Gulf Electro Cutting Oils A, B, and C
- Gulf M-L Cutting Oils A, B, and C
- Gulf Cut-Aid
- Gulf Cutx B
- Gulf L. S. Cutting Base A and B
- Gulf Soluble Cutting Oil A

GULF INDUSTRIAL LUBRICATION

It's sooner than you think...
THE SATURDAY EVENING POST
...when you may step out of an aluminum house... to commute on an aluminum bus...
...to work in an aluminum office building... then home to relax on aluminum furniture... or work in the yard with aluminum tools!
More and better aluminum products—today...with
Kaiser Aluminum
a Permanente Metals product
Get the Manufacturers' names
Permanente Products Company

What things do you think of when we say "aluminum"?

When asked that question in a recent survey, 92% of the people interviewed replied: "Pots and pans."

On the other hand, *less than 4%* mentioned such aluminum "naturals" as roofing and siding, heating and ventilating equipment, gutters and down-spouts, busses, garage doors, garden tools, home-trailers.

What does this mean?

Simply that while aluminum has proved itself the successor of other metals in hundreds of applications . . . public awareness has largely remained at the pot-and-pan level.

And without awareness, how can there be *demand?*

To increase consumer awareness of aluminum products . . . to interpret them in terms of *better living* and thus create demand . . . is the objective of the above advertisement and the many that will follow.

They will appear, in full color, in such top-read magazines as Saturday Evening Post, Newsweek, Collier's, Time, Sunset, reaching a total audience of over 30 million every month! Such advertising, we believe, is bound to influence the buying habits of a big share of this audience.

Which will mean a lot more business for the makers of aluminum products.

Ready to serve you—*today*...

Kaiser Aluminum

a Permanente Metals product

DISTRIBUTED BY PERMANENTE PRODUCTS COMPANY, KAISER BLDG., OAKLAND, CALIFORNIA . . . WITH OFFICES IN:
Seattle, Wash. Oakland, Calif. Los Angeles, Calif. Dallas, Texas Wichita, Kan. Kansas City, Mo. St. Louis, Mo. Atlanta, Ga. Minneapolis, Minn. Milwaukee, Wis. Chicago, Ill. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich. Boston, Mass. Hartford, Conn. Buffalo, N. Y. New York City, N. Y. Philadelphia, Penn. Washington, D. C.

THE AVIATION WEEK

BATTLE OF ENGINES—The toughest Thompson Trophy Race in national air race history was primarily a battle of engines. Cook Cleland's two record breaking Goodyear F2G-1's were powered with the 28 cylinder Pratt & Whitney Wasp majors rated at 3,500 hp. with a 4,360 cubic inch displacement. Their closest competitor, the Bell P-39 piloted by ex-Bell test pilot Jay Demming, was powered by an Allison V-1710 rated at 1,425 hp. with less than half the Wasp major's displacement.

Demming was first off the ground and held the lead for four laps before superior engine power put the former Navy planes out in front to stay. Even with the power deck stacked against him Demming kept his P-39 on the tail of the second place F2G all the way averaging 389 mph.,—16 mph. faster than Tex Johnston's winning time in the same plane last year.

NAVY VICTORY—Cook Cleland's flyer in Goodyear Corsair operations was strictly a Navy triumph and was so interpreted by the sea-going contingent at the races. Cleland who is now a Cleveland fixed base operator, was a Navy dive bomber. Richard Becker who flew the second place Corsair was a Navy test pilot at Patuxent and is now chief mechanic at Cleland's airport. Tony Janazzo who was killed flying Cleland's third Corsair was a former Navy fighter pilot.

Cleland's Corsairs were part of an experimental Navy order for 10 and were made by Goodyear at its Akron aircraft plant. The planes were completed in the fall of 1945. They grossed 15,000 lb. in comparison with 9,000 lb. for the Chance Vought Corsairs.

PAPER FIGHT—Navy also trotted off with honors in the public relations skirmish. AAF show was originally built around Col. Albert Boyd and the Lockheed Shooting Star (P-80R) as holders of the world speed record and lost much of its punch from the hasty revamping necessitated by the record breaking Douglas D-558 performances less than two weeks before the races. Mush mouthed drawl of Col. Robert "God Is My Co-pilot" Scott on the public address system also helped to slow the pace of the AAF performance. Navy exhibited all types from Grumman Bearcats to McDonnel Phamtoms in a snappy acrobatic parade punctuated by simulated dive-bombing and strafing attacks, TNT bomb explosions, air raid sirens and chattering anti-aircraft fire that literally jarred the crowd onto the edge of their seats.

BATTERED JETS—AAF fighter pilots in Lockheed Shooting Stars took top honors for the most rugged performance on the racing program. Competing for the Jet Thompson Trophy they swished around the 15 mile course at better than a 500 mph. clip that saw several planes and pilots take more than 12g's on the pylon turns. One P-80 smashed through a flight of birds that tore off part of the canopy, battered a wing and fouled the air duct. Other planes had bent spars, buckled fuselages, popped rivets and dented wings to show for the terrific grind that battered the pilots as hard as their planes.

RACING FUTURE—Stirred by the four crashes in the reciprocating Thompson race that killed one and injured two other pilots, the National Racing Pilots Association met in Cleveland after the races to deliberate on the future of closed-course racing. Many feel that the pace of current jet and piston planes is too fast for the 15 mile squirrel cage laps of the Thompson course.

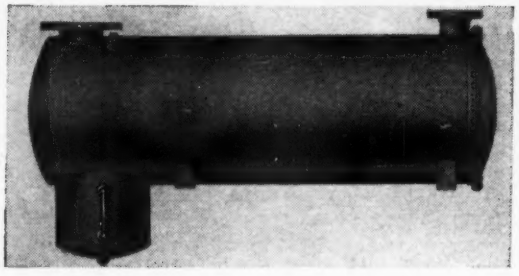
Despite a violent thunderstorm that washed out the opening day's program attendance reached 138,000 for the two remaining days assuring continuance of the races for at least another year. Thompson Products president Fred Crawford, who also heads the air race management, indicated races will be continued on a year to year basis depending on success of each year's performance.

MANUFACTURERS PLEAS—Aircraft manufacturers are preparing strong pleas on the importance of their individual roles in the national defense picture for President Truman's Air Policy Commission when it makes its transcontinental survey of manufacturing facilities next month. Tentative schedule calls for visits to Wright Field, Kansas City, San Diego, Los Angeles, Moffett Field and Seattle beginning Oct. 6. Some manufacturers not being visited are highly concerned over lack of opportunity to tell their story. Actually the tour and the commission will have little to do with determining survivors in the industry. Main purpose of the trip is to acquaint commission members, most of whom have never seen an aircraft plant, with the industry and military aviation generally. Final word on which manufacturers are to be kept alive by Air Force and Navy contracts still rests with the military not the civilian commission.

SECURITY AND CENSORSHIP—Army and Navy are putting pressure on some segments of the aircraft industry to send representatives to top officials of McGraw-Hill Publishing Co. to make a protest about AVIATION WEEK and "violations of security." This magazine does not restrict its grist to Army and Navy sponsored press releases. Public relations people among Eastern manufacturers have shown more signs of giving in to Army and Navy wishes, and have asked Western members of the National Public Relations Advisory Committee of AIA to discuss the matter. Western manufacturers so far have shown little enthusiasm for participating in the protest. The matter is important, not because it is this publication which is involved, but because it may be another indication that the whole subject of peacetime censorship will break out into the open, involving the nation's press generally.

ERIE Gasoline-Dehydrators

Six Sizes
25 G P M
40 G P M
80 G P M
100 G P M
200 G P M
300 G P M



ERIE FUELING SYSTEMS INCLUDE:
- Gasoline-Dehydrators
- Pumps
- Fueling Pits
- Truck Fill Stands
- Tank Car Unloaders
- Lubricating Oil Tanks and Pumps
- Portable Lube Units for Aviation Oil
- Gasoline Driven Pumping Units
- Valves, Fittings, Hose, Nozzles
- Air Compressors
- Air Meters

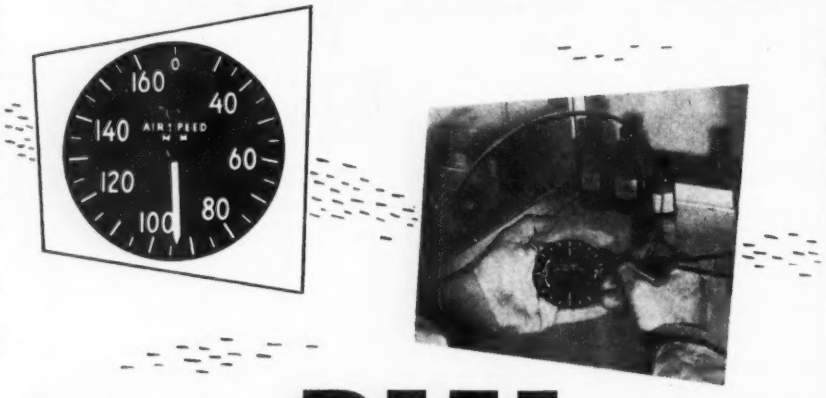
New booklet available showing the two basic types of Erie Gasoline-Dehydrators that remove over 99.99% of all entrained water from gasoline processed. Developed for the armed forces, wherever gasoline was stored and dispensed these units have been re-designed for peacetime use.

Write for copy of this new booklet.

Look to **ERIE**

ERIE METER SYSTEMS, INC.
Main Office and Plant: Erie, Pa

PHOSPHORESCENT • FLUORESCENT • RADIUM



INSTRUMENT DIAL PAINTING

Immediate Delivery
NEW INSTRUMENTS
MAPS — COMPUTERS

Send your dials to us for accurate repainting. Our facilities conform to the National Bureau of Standard's rigid specifications. For prompt service and dependable repair on all makes of usable instruments, ship them to our CAA Approved Repair Station (No. 2783).

SEND INQUIRIES TO DEPT. X

DISTRIBUTORS OF AVIATION SUPPLIES

THE S. A. LONG CO., INC.
650 EAST GILBERT • WICHITA 1, KANSAS

NEWS DIGEST

DOMESTIC

John R. Alison, Assistant Secretary of Commerce for Aeronautics, was sworn in as a member of the National Advisory Committee for Aeronautics.

Rear Admiral Lawrence B. Richardson (ret.), and Joseph F. McCarthy were elected vice presidents of Curtiss-Wright Corp. Richardson retired last year as asst. chief Bureau of Aeronautics.

Frank Cuccia, former Cadillac salesman and Marine Corps veteran, was appointed director of procurement for Glenn L. Martin Co. Cuccia has been at Martin for last three years as AAF plant clearance officer.

Don Pollard, 23-year-old Roanoke (Va.) glider pilot, won Northeastern states soaring championship at Elmira, N. Y. He flew French glider to collect $490 in altitude and distance awards.

Walter C. Jamouneau was appointed secretary and asst. treasurer for Piper Aircraft Corp. He replaces W. T. Piper, Jr., who returns to his sales department duties.

Delta Air Lines and Air France have signed interline agreements covering reservations on either line from 30 U. S. cities served by Delta and 53 countries on five continents served by Air France.

John D. Kay, U. S. Coast and Geodetic Survey, was appointed CAA assistant to the administrator for aeronautical charts. New post will maintain liaison between two agencies on aero chart matters.

FINANCIAL

DeHavilland Aircraft of Canada, Ltd. has increased its capitalization from 25,000 to 50,000 shares of class "A" and from 5,000 to 10,000 shares of class "B" stock.

Boeing Aircraft Co. reports net profit of $64,280 for six months ended June 30 after $70,000 tax refund. Sales were $10,537,268 and backlog stands at $226,557,117.

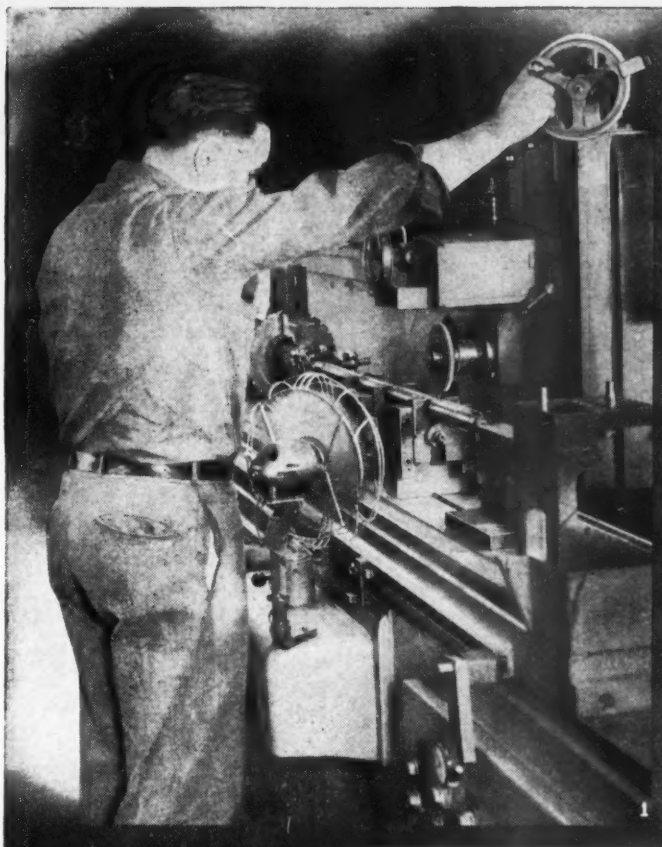
Northrop Aircraft, Inc. reports profit on fiscal year ending July 31 with total working capital at $3,200,000. Backlog now stands at about $22,000,000 largely for XB-35 and YB-49 contracts.

North American Aviation, Inc. reports net income of $303,847 for nine months ended June 30 after $4,260,500 in carryback credits.

FOREIGN

Indian independence divides Royal Indian Air Force into seven fighter and one transport squadrons for Hindustan and one fighter and one transport squadron for Pakistan. Fighters are Hawker Tempests and transports are Douglas DC-3s.

Roy Chadwick, A. V. Roe chief designer, was killed in Tudor II crash following takeoff from Woodford, Cheshire. Chadwick designed famed Avro Lancaster and some 30 other British aircraft.



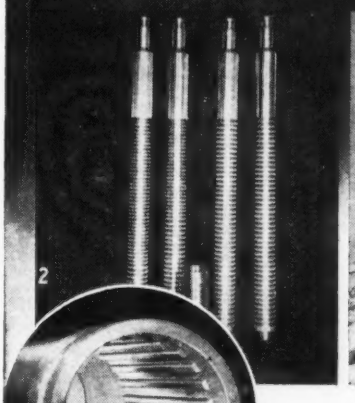
FOR BROACHES

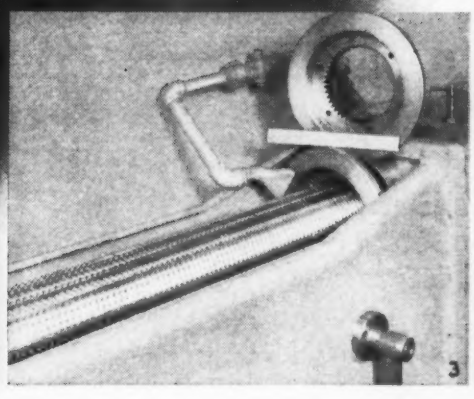
and for ALL Your Broaching Needs

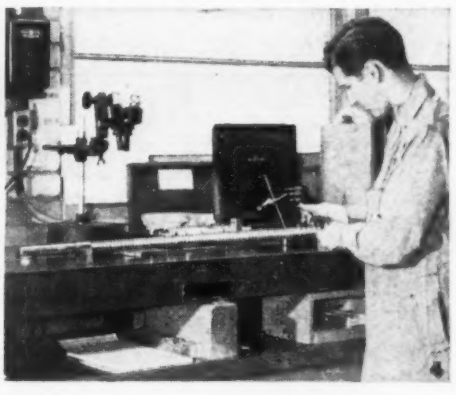
SEE *American* FIRST

You are sure of greater satisfaction when you buy broaches from *American*. This is because of *American's* broad experience in all phases of broaching—machines, tools, fixtures, and engineering. This all around experience assures you of broaching tools that will give exceptionally long life at low initial cost.

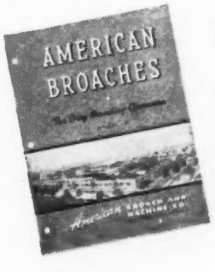
See *American* first for all types of broaches: surface, round, spline, serration, hex, square, and formed broaches in any required size. *American* also manufactures pull and push heads for broaching tools of all sizes. And see *American* first for *everything* in broaching—machines, tools, fixtures, and engineering.







(1) Grinding a spline broach. All *American* broaches are ground by skilled broach makers to exceptionally close tolerances. (2) These four broaches, used in succession, cut 24 angular splines in steel airplane landing gear struts. Broaches are 65" long, and cut a spline section 12⅛" long by 4¼" I.D. Inset shows broached interior of part. *American* manufactures broaches of every size and variety, for the metal working industries. (3) This large broach, in a standard *American* H-30-72 Horizontal Broaching Machine, cuts 46 involute spline teeth in a bevel gear part. Size of broach is indicated by 12" rule shown with broached gear part placed on top of machine. (4) Checking a spline broach for spline width in *American's* Broach Inspection Department. Every broach must pass rigid inspection before shipment.



WRITE FOR CATALOG NO. 144

Contains complete description of different types of broaches and machines. Tells uses of each. Gives information on care and maintenance of broaches, specifications of standard broaches, and other useful facts. No obligation. Write for your copy today!

MEMBER BROACHING TOOL INSTITUTE

American BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

•

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS U.S.A.

Exide AIR TRANSPORT BATTERIES

Designed to meet ALL storage battery needs of Air Transport Service . . . with Extra Capacity, Minimum Weight and Long Life.

•

AIRCRAFT REPLACEMENT BATTERY TYPES RECOMMENDED FOR TRANSPORT SERVICE

TYPE	PLATES PER CELL	VOLTS	Capacities at Rates Indicated: 5 Hr. Amp. Hr.	5-Min. Amps.	20-Min. Amps.	Over-all Dimensions in Inches: L	W	H	Net Wt. in lbs.
6-FH-13	13	12	88	368	141	13 15/16	7 1/4	10 13/16	78
12-TAS-11	11	24	42	180	67	12 9/32	9 7/8	9 7/16	90
12-TAS-13F	13	24	51	216	81	14 5/32	9 7/8	9 7/16	103
12-TS-9L	9	24	34	144	54	12 5/16	13 5/16	10 7/32	77

USED BY MAJOR AIRLINES

DOMESTIC

American Airlines, Inc.
Capitol Airlines
Chicago and Southern Air Lines, Inc.
Colonial Airlines, Inc.
Continental Air Lines, Inc.
Delta Air Lines
Eastern Airlines, Inc.
Mid-Continent Airlines, Inc.
National Airlines, Inc.
Northeast Airlines
Northwest Airlines, Inc.
Trans World Airline
United Air Lines
Western Air Lines, Inc.

INTERNATIONAL

Air France
American Overseas Airlines, Inc.
Braniff International Airways
British Overseas Airways Corp.
Danish Air Lines (D.D.L.)
KLM Royal Dutch Airlines
Linea Aeropostal Venezolana
Northwest Airlines, Inc.
Norwegian Air Lines (D.N.L.)
Pan American World Airways System
Peruvian International Airways
Sabena Belgian Air Lines
Scandinavian Airlines System (S.A.S.)
Swedish Air Lines (A.B.A.)
Swedish Intercontinental Airlines (S.I.L.A.)
Trans World Airline

Whatever your storage battery problems may be, Exide engineers will be glad to help you solve them.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

VOL. 47 • NO. 10

AVIATION WEEK

SEPT. 8, 1947

INCORPORATING AVIATION AND AVIATION NEWS

Heavy Accident Toll Weighs Against National Air Races

New speed records set as Mantz wins Bendix, Cleland takes first in crash-ridden Thompson; jet marks climb.

By ALEXANDER McSURELY

Thrill-seeking cash customers received their money's worth in speed and crashes at the 1947 National Air Races at Cleveland but the industry is still debating whether the colorful big show made sufficient real contributions to advancement of aviation to compensate for the serious damage done by the emphasis on danger and death. The home-town Cleveland Plain Dealer, told its readers next morning in a huge double eight-column headline; "Pilot killed, three others crash in Thompson race won by Cleland."

▶ **Effect Harmful**—Harmful effect of many such news stories on the aviation industry as a serious transportation business is undoubtedly enhanced rather than diminished by the glamorous show background. Logic of continued widespread industry participation in a spectacle whose conditions often invite widely-publicized air crashes is up for serious weighing. On the credit side of the 1947 National Air Races, the Goodyear Trophy races for midget planes with 85 hp. engines stood first as an undoubted stimulant to new and original design features many of which will be applicable to the commercial light plane. The clean safety record of the eight Goodyear heats indicated that the plane specifications and race requirements had been well-planned. As a result of this year's success the second year Goodyear races will probably have more entrants and will generate more new design features. Suggested changes in Goodyear requirements include; raising the present 190 cu. in. piston displacement limit slightly so that stock engines from other manufacturers besides Continental may be used; changing the location of the course so that all the race will be run in front of the grandstands; setting a deadline for completion and flight testing of race planes well in advance of actual race time.

▶ **Power Decides**—Power and tight 15 mile course were the deciding factors in the $40,000 Thompson Trophy race as the first and second finishers piloted Corsair F2G fighters powered with Pratt & Whitney 4360 Wasp major engines developing close to 4,000 hp. Cook Cleland, operator of Willoughby airport, east of Cleveland, and Navy dive-bomber pilot in World War II set a new record of 396.131 mph. for the 300 mi. race, as compared to the fastest winning time of previous races, Tex Johnston's 373.908 average last year. Richard Becker also of Willoughby, flying a sistership also owned by Cleland, averaged 390.166 mph., only slightly ahead of the third place winner, Jay Demming, Niagara Falls, N. Y., in Cobra II, a Bell O-39 Airacobra with an Allison V-1710 engine, the same plane which Johnston flew in his 1946 victory. Demming managed to get 389.837 mph. out of his Cobra II, approximately 16 mph. faster than Johnston had flown it the previous year to win. Tony LeVier, last year's second place Thompson winner, placed fifth this year in his red Lockheed P-38, finishing behind Steve Beville, Hammond, Ind., who was flying a North American P-51 powered by Packard-Merlin. Beville's time was 360.840 mph. and Levier's, 357.488. The only other finisher in the Thompson was William Bour, in an Allison-powered Bell 0-63 with 327.280 average.

Bendix Trophy

▶ **Jannazo Dies**—A third Wasp major-powered Corsair in the Cleveland team carried its pilot, Tony Jannazo, of Cleveland, former Navy flyer, to his death in the seventh lap, when he flew into the ground shortly after rounding No. 2 pylon. It was the third fatality in Thompson race history. Three other planes crashed in the race;

• **Woody Edmundson,** Lynchburg, Va., airport operator and well-known stunt flyer, crash-landed his North American, A-36;

• **J. L. Ziegler,** Kenmore, N. Y., pilot of a Curtiss P-40-Q, parachuted from his plane, in the 14th lap, in full view of the grandstand. He suffered a broken leg and a woman spectator on the ground was struck on the head by a canopy, believed to have fallen from his plane.

• **Jack Hardwick** of Arcadia, Calif., crash-landed his P-51 when the engine quit shortly after the "race horse" start in the first lap. A shoulder harness apparently saved him from injuries except for a bruised elbow, when he belly-landed the plane in a field, narrowly missing other spectators who pulled him from the wreckage.

Other crashes during the National Air Races and qualifications brought the total up to nine, believed to be the largest number of serious mishaps in any single air race. Three pilots parachuted from planes during qualifications; James Ruble, Houston, Tex., parachuted from his burning Lockheed P-38 in Arizona, in The Bendix cross-country speed dash, and Dori Marland, Pacific Palisades, Calif., woman flyer in the Halle race crash landed her North American AT-6 in a field near the Cleveland airport. None of these flyers were seriously injured.

▶ **Mantz Repeats**—Paul Mantz, Hollywood motion stunt flyer, repeated his 1946 Bendix race triumph in 1947 by a narrow one min. 17.6 sec. margin over second-placer Joe DeBona, Beverly Hills, Calif. Mantz flew his red North American P-51, Packard-Merlin Powered for a new record of 460.423 mph., for the 2,045 mile flight to win the $10,000 first Bendix money.

Other Bendix times; DeBona, 458.203 mph.; Edmund Lunken, Cincinnati, third, 411.456 mph.; Bruce Gimbel, Greenwich, Conn., fourth, 404.080; William Eddy, La Jolla, Calif., 376.849.

Other race results:

Goodyear Trophy Finals; William F. Brennand, Oshkosh, Wis., Steve Wittman Special, 165.857 mph.; Paul E. Penrose, North Hollywood, Art Chester's Sweet Pea Special, second, 165.393 mph.; H. R. Salmon, Van Nuys, Calif., Cosmic Wind Special, 158.798 mph.

Bendix Race Service Jet Division: Col. Leon W. Gray, Casa Grande, Ariz., 503.123

mph., exceeding his last year's first place time of 494.779 mph. Other service pilots landed at Patterson field, due to storm condition at Cleveland.

Thompson Service Jet Division; (over a special 22½ mi. course for 180 miles) Lt. Col. Robert L. Petit, Ventura, Calif., 500.704 mph. (lower than last year's Thompson jet winning time of 515.853 mph., due presumably to the tighter course and shorter straightaways used this year.

Kendall Oil Trophy Race for P-51s; Steve C. Beville, Hammond, Ind., 384.602 mph. (a new closed-course racing reciprocating engine record at Cleveland until the first three Thompson flyers exceeded it the next day).

Sohio Oil Trophy Race for P-38s; Tony LeVier, La Canada, Calif., 360.866 mph.

Tinnerman Trophy Race for P-63s; Hubert K. Knight, Jr., Dallas, 352.168 mph.

Halle Women's Race in AT-6s; Ruth C. Johnson, Upland, Calif., 223.290 mph.

Goodyear Consolation Race; William F. Falck, Warwick, N. Y., Chester Special, 141.615 mph.

Allison Trophy Race (Cleveland to Indianapolis to Cleveland for Army P-80 jet planes); Capt. Richard Burnor, Adrian, Mich., 494.277 mph.

▶ **Howard Outstanding**—Outstanding exhibition flying at the air races was topped by Beverly Howard, international acrobatic champion, who flew both his Piper clipped wing Cub Special, and his Buecker Jungmeister bi-plane. Precision team aerobatics by the Marine blue angels in Grumman F8Fs, and by two Army P-80 pilots who made high-speed dives to pass each other in front of the grandstand with both planes travelling near the 600 mph. mark, were other highlights. The Navy air show included a noisy simulated bombing attack on the airport, perhaps the most exciting crowd spectacle of the entire program.

▶ **Crowd Heavy**—Top crowd of the show on Labor Day was estimated at 75,000 in the grandstands in addition to probably 100,000 who watched from surrounding areas and from their cars. Sunday's crowd was estimated at 70,000, while Saturday's show except for the Bendix race, was cancelled because of heavy rains at the airport. The Sunday show combined the racing events scheduled for Saturday and Sunday, and the management honored Saturday's rain checks.

Presentation of the Weatherhead Jet Speed Trophy in turn to the three American pilots who have successfully set new world speed records was made by Frederick Crawford, Air Races President, and A. J. Weatherhead, President of the company which is the trophy donor. Col. Albert Boyd, whose P80R flight of 623.8 mph. brought the world speed record back to this country, received it first and then passed it in turn to the Navy and Marine pilots, whose flights in the D-558 Douglas Skystreak, brought the record first up to 640.7 mph. and then to its present mark, 650.6 mph., Comdr. Turner Caldwell, and Maj. Marian Carl.

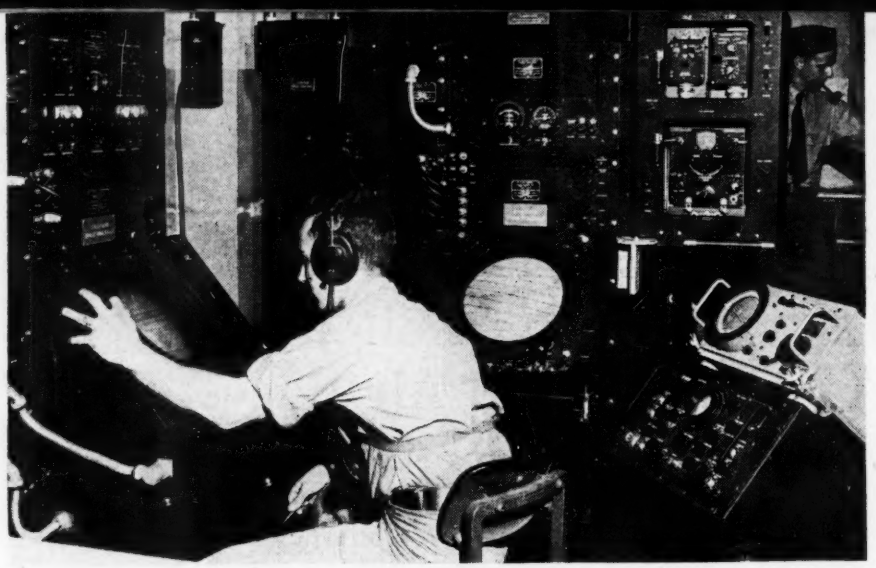


Photo shows operator at new Bendix GCA equipment recently installed at Quonset Naval Air Station.

New Bendix GCA Installed at Quonset

Navy now training traffic controllers on radar for new control tower scope installations.

A new search radar and GCA radar landing aid, made by the Bendix Aviation Corp., has been installed at the Quonset Point (R. I.) Naval Air station and soon will be operating.

Both Navy and Bendix officials look upon the new set as the possible prototype for commercial radar installations to come. All controls and scopes are located in an air conditioned room on the floor beneath the field's regular control tower.

▶ **Training Change**—According to Navy officers, hereafter all men trained as traffic controllers also will be sent to radar schools so that they can use the scopes when an airport closes in. This will eliminate most of the need for extra help to man the scopes, drastically cutting the $50,000 a year payroll for each unit which was sought in the last budget of the Civil Aeronautics Administration.

The Quonset installation consists of a radar search and height finder and a GCA or approach radar system. For the search radar, transmitters receivers and associated equipment are mounted in shelters at the top of two steel towers about 500 ft. from the operations building. Antennas are on the roofs of shelters.

▶ **Quick Shift**—The GCA unit looks much like the wartime mobile truck but contains only the transmitter and receiver equipment and necessary test rigs. Permanent concrete stands have been constructed at the sides of the runways and Bendix experts say that unit can be shifted from one position to another in about 25 minutes.

All of the outside units are linked to the control room by wires and coaxial cable. The GCA truck is 5000 ft. from the tower. Installation used about 110,000 ft. of cable. Total cost estimate: about $350,000.

Improvements in the precision landing system include an electronic follower which allows either the azimuth or elevation operator to focus the other antenna when he spots a plane, thus giving immediate information to both operators.

Another aid installed with the Quonset setup is the Bendix GDF-1 VHF ground direction finding system. This gives instant visual bearings on radio signals transmitted on any frequency between 100 and 156 megacycles.

NAA Signs With Union For 5c Wage Increase

After five months of negotiation, North American Aviation and UAW-CIO (Local 887) have agreed on a new contract carrying a wage increase of 5 cents an hour. Retroactive to June 23, the wage rise is in line with the aircraft industry's pattern for the Southern California area.

Other benefits granted include two additional paid holidays and increased sick-leave and vacation allowances. Contract's concessions, together with benefits and increases previously granted boosts company's payroll more than $2,000,000.

Under no-strike provision, company foregoes privilege of suing local or international unions and officers in event of wildcat work stoppages, if union takes action to keep members working. Also included is union no-strike pledge and company's assurance for no lockouts.

Contract is effective for two years, subject to re-opening for wage discussion after one year. Union is recognized as bargaining agent at company's Long Beach and Pacific Aviation plants.

Cosmic Wind, piloted by Tony LeVier, was one of five light racers built by LeVier and Associates.

Revamp Styles?

Lightplane Race Offers New Field For Design Tests

Goodyear trophy initiates competition for new planes with features applicable to commercial production; specifications listed.

By ROBERT McLARREN

Original design returned to the National Air Races this year with the initiation of the Goodyear Trophy Race. The new event also introduced rigid safety requirements in both the design of the airplane and the demonstrated capabilities of the pilots prior to their acceptance as starters. Skilled engineering and amateur construction fought for the trophy but experienced "know-how" brought home the prize, leaving engineers and hot pilots alike confused in their search for a race winning formula.

The Goodyear Trophy was won by a 10-year old airplane built by "Steve" Wittman of Oshkosh, Wis. who has flown in every National Air Race since the first running in 1928. The Wittman Special was redesigned to meet the Goodyear specifications prepared by members of the Professional Race Pilots Association. Modifications consisted of a new, smaller power plant, new wing and redesigned landing gear, which retained the spring steel full cantilever design patented by Wittman in 1936. With a wing area of 67 sq. ft. and a gross weight of less than 800 lb., Wittman's speedster came well within the wing loading limit of 12 lb. per sq. ft. and was among the lightest ships in the race.

▶ **Steel Tube Fuselage**—An NACA 0009 symmetrical airfoil was used for its low drag and stable center-of-pressure position, relieving the pilot of longitudinal stability problems. Fuselage is welded steel tubing with fabric covering over wood fairing strips. Wing spar and ribs are laminated spruce with fabric covering.

▶ **Chester Special**—Most original entrant in the event was Art Chester's butterfly tail monoplane exhibiting aerodynamic refinements throughout its design. Chester, who vies with Wittman for National Air Races longevity, approached the event as both experienced engineer and veteran racing pilot. Piloting the Chester Special to second prize money of $4850 was Paul Penrose, Western Air Lines pilot who won the Chalmers Trophy at Miami last February. The mid-wing design has a welded steel tubing, fabric covered fuselage and plywood covered full cantilever wings.

▶ **Cosmic Winds**—Third and fourth place money went to LeVier & Associates, a group of four backer-pilots, five engineers and 50 mechanics in Southern California. This imposing array of aircraft talent produced parts for five "Cosmic Wind" light racing planes but only two were assembled for the races. About 10,000 manhours went into the project plus $20,000 and unannounced "participation" agreements. Including LeVier's victory in the Sohio race the group took $10,200 from the races—$5,700 from the Goodyear event.

▶ **Race Requirements**—The Goodyear Trophy race offers the first set of specific racing airplane airworthiness requirements and pilot qualifications guaranteering maximum safety in an air racing event. Created by the Professional Race Pilots Association, the specifications were formulated entirely by the racing pilots themselves.

Before being entered in the event, each plane must perform a satisfactory flight test before a PRPA technical committee consisting of:

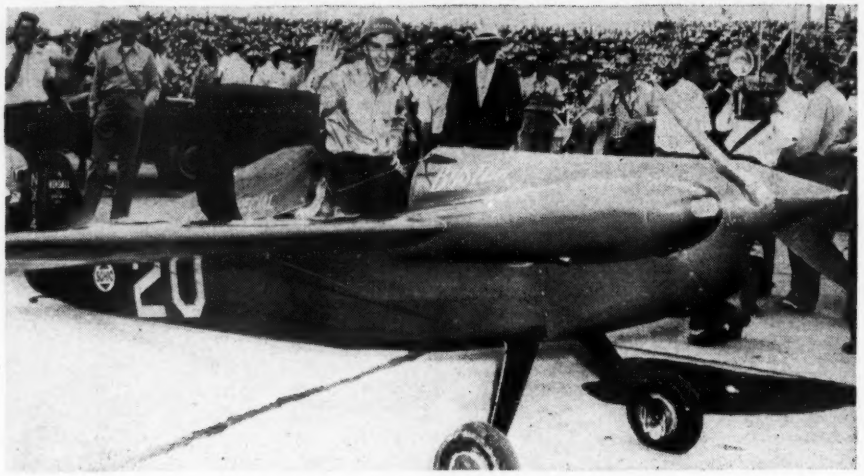
- **Full Throttle Takeoff** without veering more than 30 ft. from a straight line on the runway.
- **Pull Up From Steady**, level flight at a minimum of 6G acceleration at 5,000 ft.
- **Demonstrate a Dive** at 1.3 times the maximum level flight speed of the airplane.
- **Perform Three Tight** turns of 120 degrees without an appreciable loss of altitude.
- **Fly Three Laps** over the pylon course making turns at full speed.

Pilot requirements are designed to insure that the pilot have considerable flying time and a suitable amount of time in the racing plane he enters to indicate familiarity with stability and control features. These included:

- **At Least 500 Solo** hours or proof of 10 hours time in the racing plane for every 100 hours less than 500 logged.
- **At Least 2 Hours** time in the racing plane within the last 90 days including five takeoffs and landings prior to the qualification trial.
- **Fly The Racer** at least eight consecutive laps over the course, two laps at a speed greater than qualifying speed, or proof of previous participation on a closed course.

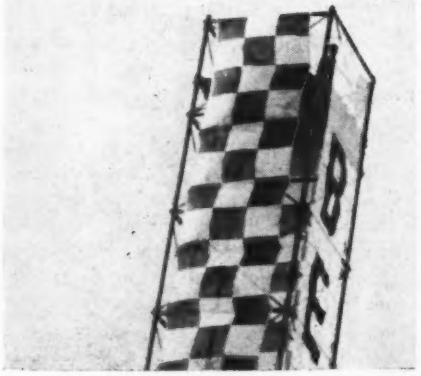
Picture Report

National Air Races at Cleveland

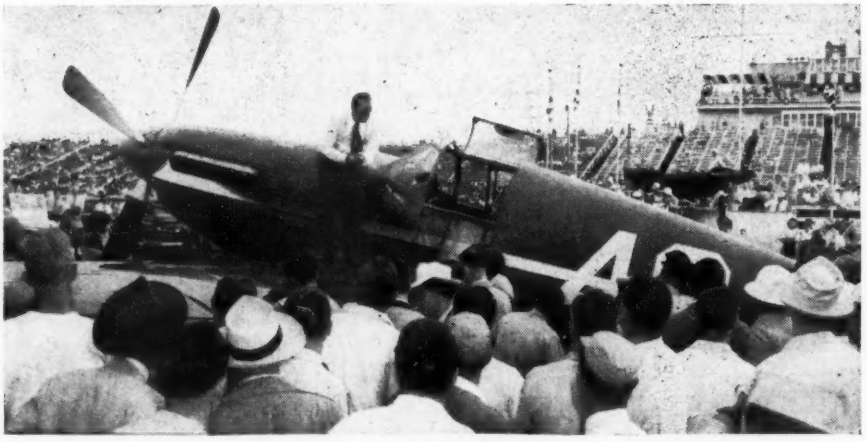


GOODYEAR TROPHY WINNER

William Brennand and the Wittman racer in which he won the Goodyear Trophy. (Press Ass'n. photos unless otherwise specified)



LeVier's Lightning rounds pylon in Sohio event. LeVier's "Little Toni" took fourth place in the Goodyear Trophy race. Sister ship piloted by Herman Salmon placed third in same race.



MANTZ ARRIVAL

Paul Mantz leaving his P-51 after winning the Bendix Trophy race.

Tony Jannazo, killed when his Corsair crashed during Thompson Trophy race.

BENDIX ENTRIES

Some of the entries in the Bendix race shown at Van Nuys, Cal., just before takeoff. (I N photo)

Marchev to Head Aircraft Screw Firm

Curtis Wright elects two vice-presidents, other personnel changes reported.

Alfred Marchev, formerly president and chairman of the board of Republic Aviation Corp. has been elected president and general manager of Aircraft Screw Products Co. of Long Island City, N. Y.

Marchev relinquished the presidency of Republic and moved up to board chairman last December. He resigned in the Spring in ill-health and returned to the industry only recently as a member of the board of Aircraft Screw Products.

In other personnel actions:

• **Curtiss-Wright Corp.** named Joseph F. McCarthy and Lawrence B. Richardson vice-president. McCarthy has been with C-W since January as treasurer and controller. Richardson, formerly deputy chief of the Naval Bureau of Aeronautics, joined the company a year ago as assistant to president Guy W. Vaughan.

• **Menasco Manufacturing Co.** elected Henry P. Nelson executive vice-president and general manager and Gerald Preshaw secretary-treasurer. Donovan H. Tyson resigned as executive vice-president, treasurer and general manager. Nelson formerly was the company's eastern representative. Preshaw formerly was vice-president and treasurer of the Aireon Manufacturing Corp., and during the war was comptroller of the Douglas plant in Chicago.

• **Lockheed Aircraft Corp.** announced the resignation of Roger Lewis, assistant general manager. He had been with the company for 13 years. He has not disclosed his plans.

• **Sperry Gyroscope Co.** appointed Dr. W. L. Barrow chief engineer. He has been with Sperry since 1943 as director of armament engineering.

• **Curtiss-Wright Airplane** division appointed T. B. Focke factory manager at Columbus, succeeding R. A. Fuhrer who resigned. Focke served during the war as a captain in the Navy and at one time was head of the production planning division of the Bureau of Aeronautics.

• **Gladden Products Corp.** announced the resignation of William P. Stratton, Jr. as sales and advertising manager. His successor has not yet been appointed. Stratton has accepted the post of sales and advertising manager of the wheel division of Roll-Rite Corp., Oakland, Calif.

• **Douglas Aircraft Co.** named W. S. Fryer to succeed P. L. Porter as part sales manager. Fryer, formerly Porter's assistant, has been with Douglas for 12 years.

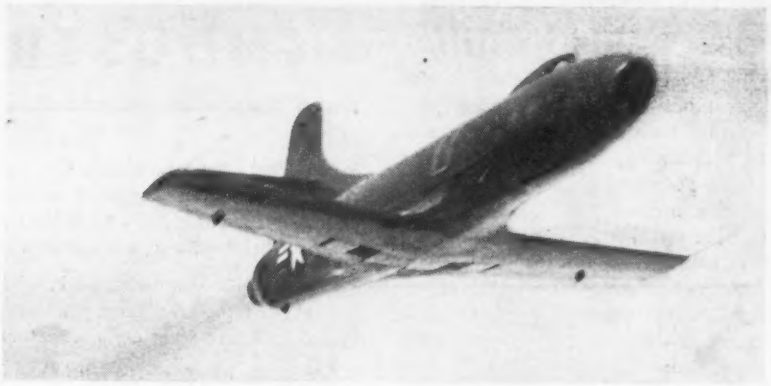
• **Raybestos-Manhattan, Inc.** appointed Harry C. Dishman equipment sales manager with headquarters in Detroit; George T. Young, manager of the Detroit office; E. E. Juergens, manager of the Cleveland office; and John E. Cole, manager of the Chicago office. They all have been with the company for a number of years.

• **General Electric Co.** named H. C. Carroll engineer in charge of the marine and aeronautics engineering division to succeed Ray Stearns who has retired after 45 years with the company. Carroll has been assistant engineer of the division.

• **Consolidated Engineering Corp.,** Pasadena, Calif. elected Dr. Fred C. Lindvall to the board of directors. He is professor of electrical and mechanical engineering at California Institute of Technology.

Strike Cancelled

Following recent expiration of a CIO-UAW contract with Ryan Aeronautical Co., a scheduled machinists' strike was cancelled upon report that the National Labor Relations Board would conduct a hearing to determine whether this union or International Assn. of Machinists should bargain for workers. CIO-UAW's February demand for 23½ cents per hour had been reduced to 15 cents.



DOUGLAS SKYSTREAK ON RECORD RUN

Fastest action shot of a man in motion ever taken shows Marine Major Marion Carl streaking over Muroc speed run at 650 mph. Short-span, low aspect ratio wings accent high-speed design of the D-558 in this view. Two airspeed heads are used, one for pilot's airspeed indicator, other for recording equipment on research shelf behind pilot. (Navy photo)

NEW D-558 CANOPY

Closeup of D-558 with Comdr. Turner F. Caldwell, Jr., shows new heat-resistant canopy installed for speed record runs replacing former plastic design which indicated failure from 170 deg. temperatures created by record-breaking speeds. Also shown are air bleed ports in duct center plate, the lower providing high ram pressure air for cockpit refrigeration unit, the center holes providing pressure pickup points for duct research. Fuselage dive brakes may be seen on aft fuselage in retracted position. (Navy photo)

AVIATION CALENDAR

Sept. 10—ICAO legal committee, Brussels.
Sept. 13-14—Wisconsin Civil Air Corps convention, Milwaukee.
Sept. 8-12—Second annual conference and exhibit. Instrument Society of America, Hotel Stevens, Chicago.
Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.
Sept. 16—International Air Transport Association, technical committee, Nice.
Sept. 16-18—Second Regional CAA conference, Atlanta.
Sept. 17 — ICAO meteorological division Montreal.
Sept. 23—ICAO aerodromes, air routes and ground aids division, Montreal.
Sept. 23—ICAO joint air/ops committee meeting, Paris.
Oct. 2-4—Autumn aeronautics meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Oct. 3-4—Arizona State Aviation Conference, Douglas, Ariz.
Oct. 10-13—Southern Calofarnia National Air Races, Long Beach, Cal.

Willis Tear Gas to India

Contract to fly 12,500 lb. of tear gas from Pittsburgh to Karachi, India for the India government has been awarded to Willis Air Service, Teterboro, N. J.

Contract carriers bid on the shipment, originally 17,000 lb., through an American export organization, but arrangements were shifted to a British exporter who obtained a charter rate from BOAC.

Subsequently the load was reduced and the job assigned to Willis, which has a blanket contract with a Rome shipper to provide return cargo when returning ships may be in need of payload.

Jack & Heintz Sales Boost Yields Profits

A steady increase in gross sales, with a resultant profit in the first six months of this year, has been shown by Jack & Heintz Precision Industries, Inc. in a strong comeback from postwar difficulties.

Second quarter sales of $6,727,719 nearly doubled the total for the first three months, with fractional horsepower motors accounting for approximately 50 percent of the billings. Aircraft products produced about 15 percent of the income. No comparative data are available for the like period of 1946, as the former Jack & Heintz, Inc. was reorganized into the new company by a merger in March, 1946. For the third quarter of 1946, sales were $1,566,315, and for the fourth quarter, $2,850,289.

With six months sales this year at $10,444,300, J&H realized an operating profit of $507,409. Non-recurring income of $524,808 pushed the net to $1,032,218. Due to heavy losses last year, there are no taxes chargeable against this income. An unaudited loss of about $318,000 was sustained in the first quarter.

► **Profit Potential**—Company feels that the upward sales curve may be checked in the third quarter of this year due to a three-week plant-wide shut-down for vacations. Despite this, the company does not feel it has achieved its full profit-making potentials. The six-month report points out that "during this period earnings were adversely affected by continued costs of reconversion for peacetime production, development of new products, and preparation for production of such products."

As of Aug. 1, J&H had a backlog of unfilled orders amounting to approximately $43,000,000. With the boosting of sales came re-hiring to increase the number of employees to 4,100.

SKY MARKER

Sample of the airmarkers that will be painted along Skyway No. 1 between Los Angeles and Washington D. C., for the benefit of private pilots flying the route.

INDUSTRY OBSERVER

► **Navy and Glenn L. Martin Co. plan an extensive test program with two P-4M-1's, long range patrol bomber featuring combination of jet and piston engine power, already completed. Navy already has an order for seven more P-4M's. Funds for about 20 additional planes of this type were restored in final version of Navy's 1948 budget.**

► Lockheed has completed 30 P2V's, long range twin engine patrol bomber of the Truculent Turtle type, of its original order for 98. Navy has one P2V squadron in service on the Pacific coast and plans early activation of another for the Atlantic coast.

► **AAF plans to equip its 14th fighter group at Dow field, Maine with Republic P-84 Thunderjet fighters before the end of the year. AAF credits the P-84 with a 7,500 ft per min. rate of climb.**

► Pratt & Whitney have already boosted their Wasp major engine (rated at 3,500 hp.) to 4,000 hp. under test conditions and expect to get 5,000 hp. within 18 months through achieving high brake mean effective pressure.

► **Sperry Gyroscope Corp. is experimenting with remote control devices for Boeing B-29's. Seven C-54's of the AAF All Weather Airline are being equipped with Sperry A-12 autopilots with automatic approach control units making possible automatic landings on the Sperry microwave landing systems now installed for service testing at Andrews field Md. and Wilmington, Ohio.**

► Glenn L. Martin Co. has a Navy project for a giant flying boat larger than the 80 ton Mars. The new boat will incorporate the new NACA designed planing tail hull which promises sizeable drag reductions over conventional hulls.

► **RCA is putting finishing touches on the first field equipment for Teleran, its radar-television, all-weather flying and traffic control system. First installation will be used for joint AAF, CAA and Air Transport Association flight tests at Andrews field, Md. this fall.**

► Howard Hughes' high alitude photo plane, the XF-11, is due at Muroc soon for final flight testing. Hughes' test pilot, Jack Williams, has put the XF-11 up to 30,000 ft. without incident. He is scheduled to do dive tests up to compressibility and then placard the plane at 10 percent lower for guidance of AAF pilots when they fly formal acceptance tests that determine whether AAF will allow Hughes Aircraft Co. a profit on the venture.

► **Navy's latest jet fighter, the North American FJ-1 was badly damaged en route from Muroc to the Naval Air Test Center at Patuxent, Md. The plane, piloted by Al Conover, averaged 496 mph. for the Muroc-Oklahoma City leg of 1150 miles at cruise power. On take-off from Oklahoma City the tail pipe caught fire and badly damaged the plane before Conover could get it down.**

► North American XP-86 swept-wing fighter was scheduled to undergo preliminary test flights at Muroc Army Air Base, Calif. last week. Straightline takeoffs and landings are not considered official test flights and they are used only for general longitudinal stability tests of the XP-86 "fore and aft" balance. Plane closely resembles Navy XFJ-1 with addition of swept-wing panels. North American test pilot Al Conover believes the plane capable of considerably more than its design 650 m.p.h. top speed.

► **NACA's XS-1 highspeed flight research program got under way last week with Howard Lilly, Aircraft Propulsion Research Laboratory, and Herbert Hoover, Langley Memorial Aeronautical Laboratory, named as test pilots for the program. Both are stationed at Muroc Army Air Base undergoing preliminary training for the flights. This training consists of engine ground runup followed by preliminary glide tests without power. First power flights in the long, tedious research flight test program are scheduled for mid-Sept. In the meantime Capt. Charles Yaeger, AAF test pilot on the Army's XS-1, has completed several air-launched gliding flights preparatory to the start of the Army's performance test program.**

► Douglas, Navy and NACA engineers are studying the results of the D-558 record-breaking flights, which indicated the onset of compressibility in the nose inlet diffuser at a mach number of .8 resulting in a sudden drop in turbine speed.

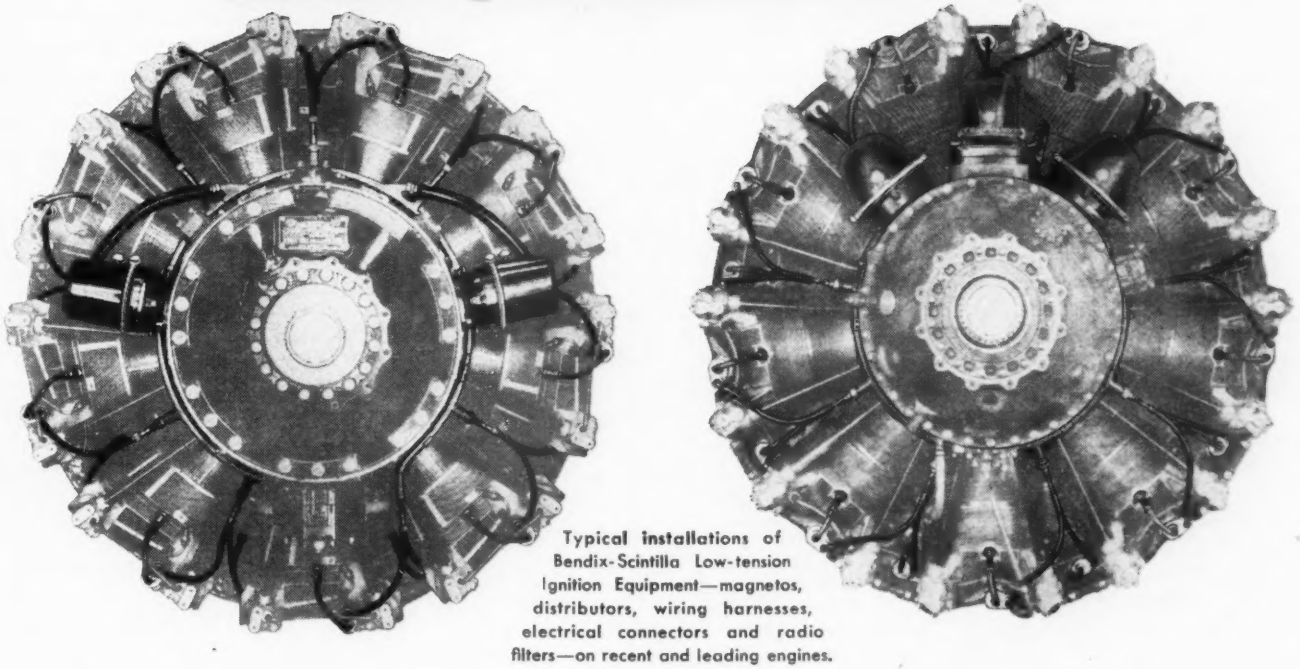
► **Northrop has again temporarily suspended its Flying Wing (B-35) bomber test program due to propellor gear box trouble. The giant all-wing aircraft was grounded during most of last winter for the same cause. As a result only 20 hours of flight time have been possible during the past year during which 24 propellor failures were experienced. Since propellors are Government-furnished equipment Northrop decided to suspend its test program until suitable propellors are furnished.**

► The Douglas AD-1 Skyraider, new Navy attack plane, recently passed its carrier qualification tests aboard the escort carrier Sicily.

On Nearly Every Mile of Transport Flight...

BENDIX-SCINTILLA

IGNITION EQUIPMENT

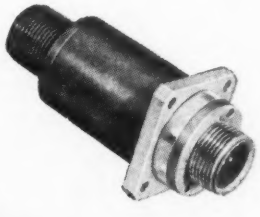


Typical installations of Bendix-Scintilla Low-tension Ignition Equipment—magnetos, distributors, wiring harnesses, electrical connectors and radio filters—on recent and leading engines.

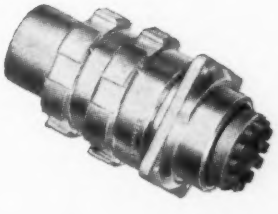
Clear-cut superiority has won for Bendix-Scintilla* Ignition Equipment a place on virtually every commercial transport in use in America. Mile after mile, air-hour after hour has proven and reproven the quality of Bendix-Scintilla Ignition products—in use on *every* airline, and specified by *every* major engine manufacturer. Bendix-Scintilla builds both high-tension and low-tension aircraft ignition systems. The newly developed low-tension systems are designed for extra efficiency, especially at higher altitudes. Write for the new brochure, fully illustrating and describing the low-tension system with its outstanding features.

*TRADE MARK

Bendix-Scintilla Radio Interference Filters are designed for insertion in aircraft ignition grounding circuits. Extremely successful in eliminating radio noise at very high frequencies.



Bendix-Scintilla is also a leader in the field of Diesel Fuel Injection Equipment, and it is in wide use on railroad, marine and stationary Diesel engines.



Bendix-Scintilla Electrical Connectors are built in a wide variety of sizes and types. Precision-designed to give a pressure-tight, water-tight and radio-quiet assembly.

BENDIX SCINTILLA

SCINTILLA MAGNETO DIVISION of SIDNEY, N. Y.

Bendix AVIATION CORPORATION

Anti-climax Seen in CAB Approval of Denver-Los Angeles Route Sale

Significance to Western outpoints benefits to United, already serving Los Angeles directly through route consolidations.

Civil Aeronautics Board approval of the sale of the Denver-Los Angeles route by Western Air Lines to United Air Lines (AVIATION WEEK, Sept. 1) was an anti-climax in many respects. A few months ago, United attained its long-sought objectives of a direct entry into Los Angeles from the east through the simple expedient of route consolidations granted by the CAB.

In a four-to-one decision, the Board sanctioned United's purchase of Western's Denver-Los Angeles franchise and other facilities for $3,750,000, the original price agreed upon by the two carriers. This transfer will become effective by September 17. Chairman Landis dissented, maintaining that the sales price should have been reduced by $1.5 million, representing the difference between the purchase price and Western's original cost.

▶ **Sale Conditions**—The Board tacked on two conditions to the sale, both of relative minor significance. The amount of $1.5 million, representing the price paid for intangible values, must be charged to United's surplus account. Further, no local service can be conducted by United between Los Angeles and Las Vegas, Nevada.

The CAB found that Western paid $2,022,400 for the tangible properties to be transferred. After depreciation, the properties were worth $1,691,188, leaving more than $2 million for intangibles.

▶ **Landis Dissent**—Mr. Landis, in his dissent, took a serious view of the Board's decision, stating that it would have "inflationary" consequences and "equally serious effects on future mergers, consolidations and route transfers." Further, a series of mergers and route transfers will be provoked that will be "irrational and unfortunate because they will be dominated by the principle of selling to the highest bidder." The chairman continued that if the public is to pay for the mistakes of past management, "it would be far cheaper in the long run for the public to make an outright gift to Western of $1.5 million rather than introduce a doctrine that will promote inflation, make against an integrated route pattern, and at the same time cost the public $1.5 million and more."

Thus far, there is not a single instance where the Board or its predecessor, has ever insisted upon maintaining the purchase price of any route franchise in line with tangible values.

▶ **Marquette Deal Recalled**—A merger of unusual interest surrounded the proposed acquisition of Marquette Airlines by TWA in 1939 for $473,333. Also, a commission of $35,000 was to be paid to another airline official for arranging the transfer. The Board, in July, 1940, denied this application chiefly on the ground that the price was excessive. Taking the hint, TWA, a few months later, filed another application, this time offering to pay $313,333 or a reduction of about one-third of the original price. This time the Board approved with member Edward P. Warner dissenting.

The Board's reasoning is the first instance carried strong implications. At that time, the CAB declared: ". . . it would be clearly adverse to the public interest to allow a certificate of convenience and necessity to be treated as if it were a speculative security, to be sold by the holder to the highest bidder . . ." While in its later decision, the Board approved, Dr. Warner disagreed, and declared: "If, as the Board then held, it is not consistent with the public interest to allow the transfer of air carrier properties under conditions involving the payment of substantial compensation for the bare certificate . . . the terms now proposed are as clearly contrary to the public interest as were those of five months ago—for it is impossible to discover that Marquette has had anything in its possession other than the certificate, which has a value approaching either the compensation proposed in July or that now proposed."

▶ **Other Acquisitions**—United has figured prominently in other route and property acquisitions. During 1943, the Board approved United's purchase of a 75 percent interest in LAMSA, a Mexican airline. The price was $145,750. Of this amount, $32,000 represented the book value and the balance, $113,750 was applicable to franchises and goodwill. This time, with no dissents, the Board asserted that the purchase price was "not disproportionate to the values actually attached to the properties and business of LAMSA, including the operating rights."

In January, 1937, United sought to serve Denver on its transcontinental route instead of being forced to go through Cheyenne. At that time, the air mail routes were in the province of the Post Office Department but their value was the same. Inland Air Lines, then Wyoming Air Express, sold its Denver-Cheyenne route to United for $209,000. A few days later, the Post Office, in an independent action, placed Denver on United's system.

▶ **Western Position Strengthened**—There is no question that Western's financial position has been strengthened considerably by the recent Board Action. The carrier previously received a $1 million payment which would have been considered a loan with interest at 3 percent, if the sale had been turned down by the CAB. The fact remains that Western now receives a tangible payment, at an increment, for a route whose value has been largely nullified by the Board's previous route consolidation action.

This added cash will help Western clean up its financial picture. As of March 31, 1947, the company had a negative working capital balance of about $6.5 million. Notes payable alone aggregated $6,597,468. The $3,750,000 will make a sharp reduction in these liabilities. The Reconstruction Finance Corp. has previously indicated that, subject to CAB approval, it was prepared to loan Western $4,500,000 to fund the carrier's liabilities.

▶ **Inland Sales Attempt Expected**—Moreover, it is only logical to assume that Western will now attempt to sell its Inland Division to attain its avowed purpose of confining itself west of the Rockies and conducting a truly "regional" operation. It is interesting to note that in 1943, Western purchased a majority stock interest, with CAB approval, of Inland Airlines at a price of around $2.65 per share. With a 164,218 share capitalization for Inland, a total purchase price of $435,178 was indicated. Inland's book value was then stated at about half of this amount. Currently, the market price on the few remaining shares of Inland held by the public, is around $4 per share.

It is conceivable that Northwest, Mid-Continent and Continental would be interested in acquiring all or parts of the Inland division. It is moreover possible that United may find some interest in acquiring the Twin-Cities-Denver leg of this system. This would strengthen its service to this area and could tie-in effectively with its newly-acquired Denver-Los Angeles run. In any jockeying for the Inland Division, the only certain feature is that Western is willing to sell, the buyers have yet to tep forward, publicly at least. —**Selig Altschul**

Wright Monument, Devil Hill, Kitty Hawk, N. C. Ordered by Act of Congress. Dedicated Nov. 1932. Beacon-lighted. Legend reads . . . "In Commemoration of the Conquest of the Air by the Brothers Wilbur and Orville Wright, Conceived by Genius, Achieved by Dauntless Resolution and Unconquerable Faith."

A monument to "taking pains"

• Rising sixty-one feet above Kill Devil Hill at Kitty Hawk, N. C. is a monument that enduringly commemorates an airplane flight that endured only 59 seconds.

• It was the world's first successful powered flight; the flight that got man off to the conquest of the air. It was made possible by the genius of the Wright Brothers . . . plus "the infinite capacity for taking pains" that genius must have to accomplish its mighty ends.

• From the Wright Brothers . . . and from that other great pioneer of heavier-than-air flying, Glenn H. Curtiss . . . Curtiss-Wright has inherited the tradition of long-range planning and the capacity for sticking to a job till it's done right.

• Out of this great heritage have come . . . and are still coming . . . airplanes, engines and propellers bearing the dependable stamp of Curtiss-Wright design . . . bringing closer the day when the sky will be every man's thoroughfare.

FIRST IN FLIGHT

CURTISS-WRIGHT

CORPORATION

30 Rockefeller Plaza, New York 20, New York

Divisions of Curtiss-Wright Corporation

Curtiss Airplane Division
Curtiss Propeller Division
Wright Aeronautical Corporation
L. G. S. Spring Clutch Corporation
Marquette Metal Products Company
Victor Animatograph Corporation

PUTS NEW ZIP IN YOUR FLYING *Automatically!*

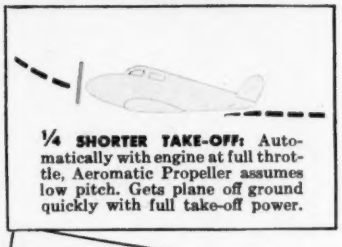
AEROMATIC* PROPELLER SELECTS ITS PITCH WITHOUT EXTRA CONTROLS OR INSTRUMENTS

That's right! An Aeromatic doesn't change your instrument panel a bit. But it makes a whale of a difference in your flying! Shorter take-offs, faster climbing, better cruising, safer landings . . . less fuel consumption and engine wear . . . An Aeromatic does all these things for your personal plane by maintaining correct pitch every second of the way. And this "propeller with a brain" is the *only* propeller that does it *automatically!*

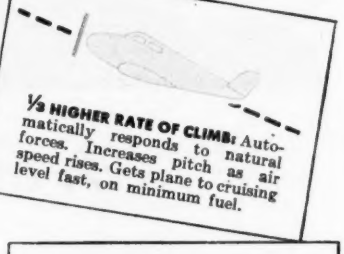
WRITE FOR INFORMATION! If you own a new plane or plan to buy one, enjoy the extra advantages of an Aeromatic Propeller. Write to your aircraft manufacturer or distributor and ask about an Aeromatic for your plane. Or drop us a line for your free Aeromatic booklet. Koppers Co., Inc., Aeromatic Propeller Dept., 249 Scott St., Baltimore 3, Md.

CUSTOM TAILORED FOR THE PLANES THEY FLY

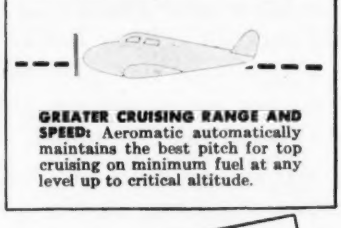
They are available now for most new planes and are being approved for other makes and models.



¼ SHORTER TAKE-OFF: Automatically with engine at full throttle, Aeromatic Propeller assumes low pitch. Gets plane off ground quickly with full take-off power.



⅓ HIGHER RATE OF CLIMB: Automatically responds to natural forces. Increases pitch as air speed rises. Gets plane to cruising level fast, on minimum fuel.



GREATER CRUISING RANGE AND SPEED: Aeromatic automatically maintains the best pitch for top cruising on minimum fuel at any level up to critical altitude.

SAFER LANDINGS: Aeromatic automatically adjusts its pitch for a long, flat glide. Moves to low pitch instantly for a quick pickup if pilot overshoots his field.

Aeromatic

The propeller with a brain KOPPERS *for your personal plane*

Air Controlled Automatic Propeller--Licensed under Patents of Everel Propeller Corp.
*Reg. U.S. Pat. Off.

Production Plans Set For Beaver With Foreign Prospects Good

De Havilland's Canadian bush freighter completes first flight; high performance with load attracts interest abroad.

Having completed a successful test flight, the Canadian-designed and built bush freighter, de Havilland Beaver, will go into production shortly at the company's Toronto plant, with a rate of one a week expected to be attained within a year.

While aimed principally at the home market of mining, oil and fur companies and charter operators, in Canada's sparsely-developed areas, the Beaver is specially fashioned for load carrying and already is showing promise of becoming a factor in the export trade.

▶ **Foreign Interest**—De Havilland officials state that inquiries have been received from Scandinavian countries, from South Africa, Australia and South America. Distinctive features of the Beaver apparently make it appealing for use in high altitudes.

Meanwhile, the company is assured of the sale of 25 of the planes to the Ontario Provincial Air Force, a government forestry and forest-fighting service, which has specified deliveries over a three-year period with 12 to be accepted by the end of 1948. The company reports tentative sales of 25 additional planes.

The Beaver, the second postwar Canadian-designed plane to come from the de Havilland plant (the first was the all-metal Chipmunk trainer), is an all-metal single-engine high-wing monoplane that can be equipped with wheels, floats or skis. It can be used as a light transport carrying five passengers plus pilot, or as a freighter with all seats except the pilot's being removable.

▶ **Quick Take-off**—It was constructed with the emphasis on high rate of climb (1,280 fpm. at sea level at 4,400 lb. gross weight) and quick take-off (515 ft. at sea level, zero wind and 40 degree flaps) to accommodate operations from small lakes and primitive landing strips.

Span of the Beaver is 48 ft., and length (landplane) 30 ft. Length of seaplane version is 32 ft. Outside fuselage width is 52 in. Fuel capacity is 80 gal. Edo model 4580 all-metal floats are standard on the seaplane. Provision is made on one of the floats for carrying a 16 ft. canoe.

In passenger version, the Beaver has space for baggage stowage on each side of the single rear seat. A large separate compartment to the rear of the cabin is for emergency bush kit, emergency rations, etc. Passenger seats are easily removable and the cabin has a reinforced floor. Floor under the removable seat next to the pilot is on the same level as the balance of the cabin so that long cargo items will lie flat.

There are four doors on the fuselage, two on each side for the pilot's and freight compartments. The main rear doors (for freight) are flush with the floor. Hatches are provided in the rear wall of the cabin and underside of the fuselage to enable long pieces of freight, such as a 10 ft. diamond drill, to be loaded and stowed. Gross capacity of the cabin is 144 cu. ft.

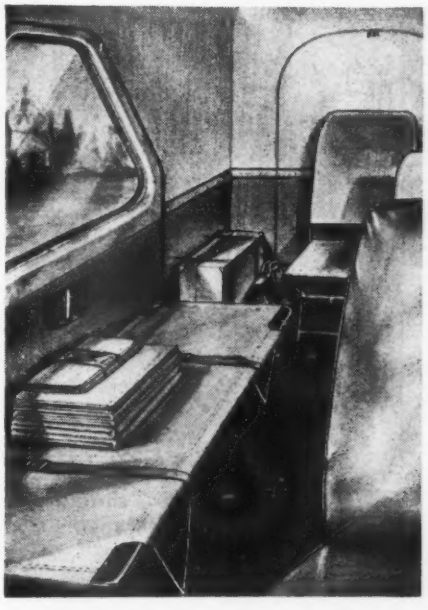
Gas tanks are installed under the cabin floor, thus eliminating any need to climb on the wing to refuel. Filler necks are positioned on the port side and can be serviced from the ground or while standing on floats, which also allows ground crew to see fuel contents gauge while refueling.

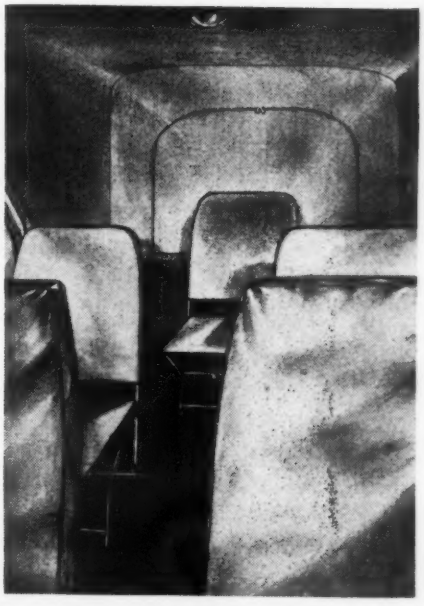
Specifications for the Beaver with Pratt & Whitney Wasp Junior 450 hp. engine allow a maximum speed for the landplane of 160 mph. and 147 mph. for the seaplane version. Cruising speed is 138 mph. for landplane, 127 mph. for seaplane at sea level, slightly higher at 5,000 feet. Absolute ceiling is 19,500 feet for landplane, 18,000 feet for seaplane.

The Beaver can carry 4 or 5 passengers and baggage or a freight load of just over a half ton. Visibility of pilot's cabin has been increased by fairing the wing root.

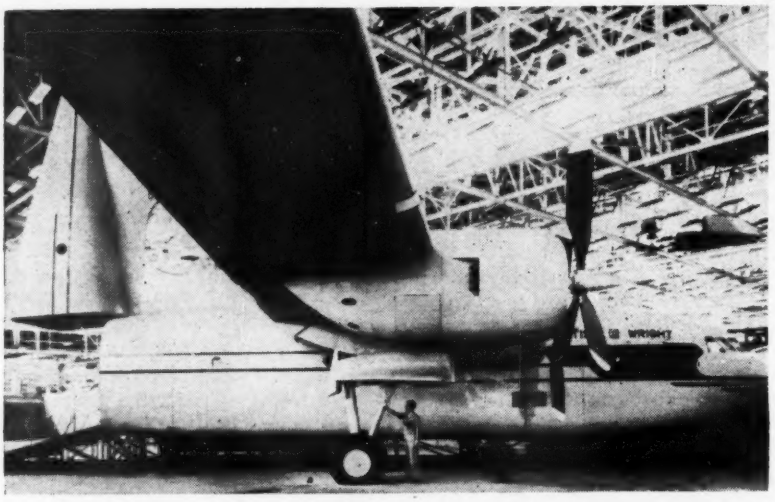
The Beaver is priced at $25,000 with both wheel and float landing gear.

De Havilland Beaver on first flight.





Versatility of de Havilland Beaver is indicated in this interior drawing. Wide cargo doors admit a standard stretcher, which is fastened to the floor, leaving ample room for seating three passengers. As an all-passenger plane, the Beaver carries five seats, positioned to permit maximum amount of comfort in the 144 cu. ft. cabin.



Curtiss-Wright CW-32 four-engine cargo mock-up now being shown prospective customer at the airplane plant in Columbus, Ohio.

C-W Shows Cargo Plane Mock-up

Company claims craft can handle any cargo now going by rail.

While completing and showing a mock-up of its proposed four-engine cargo plane, CW-32, at its Columbus airplane plant, Curtiss-Wright Corp. is delaying production plans until definite commitments can be obtained.

Prototype, originally scheduled to be flying sometime next year, will not be built immediately. A further change in the company's plans for the 100,000 lb. plane is the substitution of 2,100 hp. Pratt Whitney R-2800 engines for the 1,525 hp. R-1820 Wrights listed in the specifications when the plane was announced last November.

The change was made both to obtain more power for the plane in view of raising the gross from 80,000 lb., and to conform to suggestions of prospective buyers.

► **Military Interested**—Two cargo carriers, Slick and Santa Fe, are understood to be studying the CW-32, and an AAF contract for a limited number is still a possibility. AAF officers went over the mock-up thoroughly.

If orders are forthcoming, C-W states it could build the first airplane in 12 months.

The CW-32 is one of the few postwar planes designed specifically and solely for cargo carrying. An innovation in loading arrangements is achieved by providing for the entire tail section of the airplane to swing up, exposing the full interior of the cargo hold. A heavy field gun or a 7½ ton truck can be driven aboard.

► **Rail Competitor**—Cargo hold can accommodate a shipment weighing up to 32,000 lb. and measuring 48 ft. long by 9 ft. wide and 7 ft. high. Overall length of the cargo hold is 61 ft., and capacity is 4,800 cu. ft. The company claims the CW-32 can handle practically any type of cargo that now goes by rail.

In addition to the cargo entrance afforded by the hinged tail section, the plan has large cargo doors on either side of the fuselage, placed at truck-bed height. Because of the plane's high-wing design, a truck can back up to the side and discharge its cargo directly into the hold.

Curtiss-Wright claims the plane can carry a ton of cargo from New York to San Francisco at a direct flying cost of $112.

Kollsman Announces Tachometer-Recorder

Tacholog, a combination tachometer and engine-hour recorder, measures revolutions per minute, eliminates the need for keeping a separate engine log for maintenance overhauls. Kollsman Instrument Division of Square D Co., 80-08 45 Ave., Elmhurst, N. Y., makes the lightweight device, which is designed specifically for use in small aircraft.

The instrument provides a cumulative indication of engine hours based on an average cruising speed of 2,000 r.p.m. Hours are counted at a slower rate when the engine is idling and more rapidly when the engine is operated at higher speeds. The instrument operates on either clockwise or counter-clockwise drives.

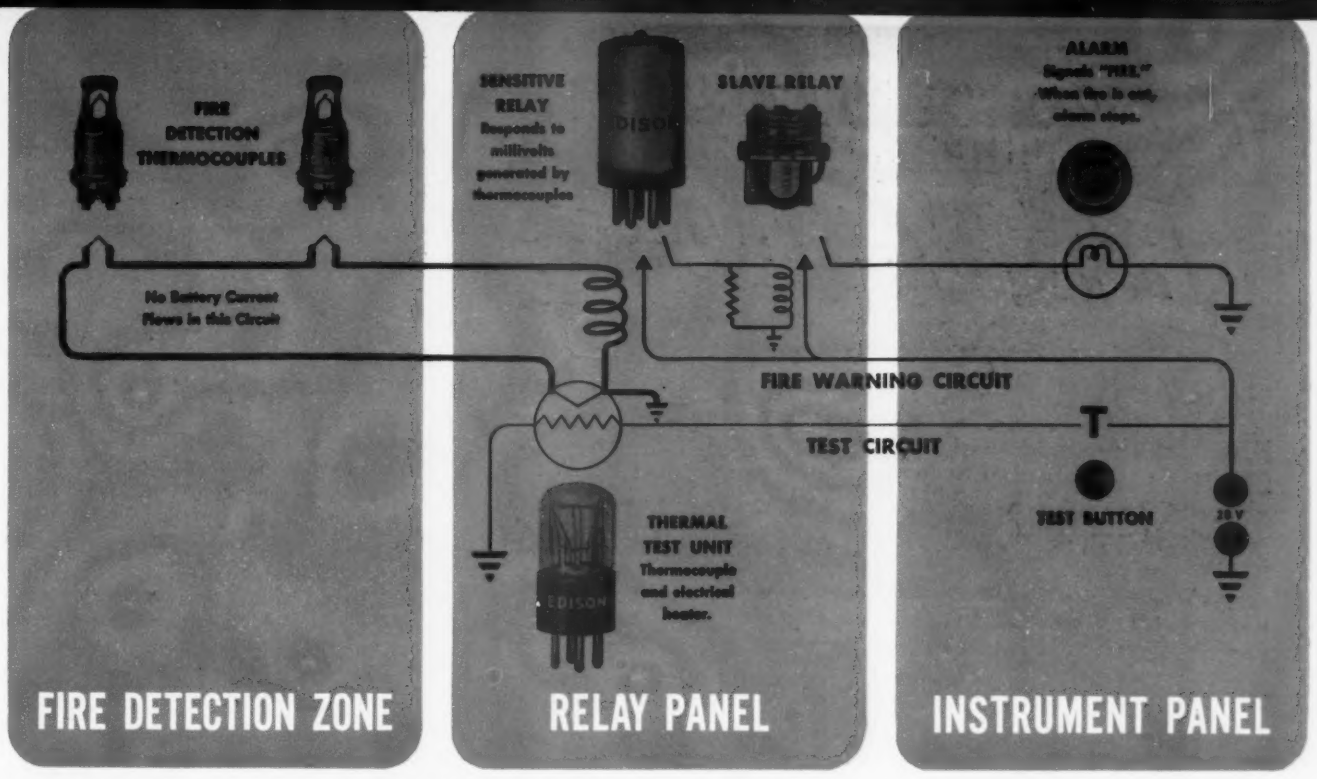
Kollsman claims that Tacholog has no adverse effect on the compass, even when the Tacholog and compass are installed side by side.

Former Bell Plant Sold

Four large buildings and 65 acres of the original Bell Aircraft Corp. property at Niagara Falls have been purchased from the War Assets Administration by the Carborundum Co. for $1,000,000. The tract and buildings are part of the plant formerly operated by Bell but released by the firm last May as not required in its future program.

2-0-2 READY FOR AIRLINES

Culminating more than three years of discussion, design, manufacturing and sales efforts, Glenn L. Martin Co. officials fix the NC to the 2-0-2 airplane that recently completed the first accelerated service test after CAA granted an approved type certificate (Aviation Week, Aug. 18). O. E. (Pat) Tibbs, Martin's flight director who conducted the 2-0-2 tests, handles the spray gun as watching are, left to right: George Trimble, Jr., chief of aerodynamics; M. E. Gaydos, CAA flight analyst; Don. K. Covington and Stanley C. Cook, flight test engineers; and F. O. Furman, superintendent of airport.



Here's why the EDISON aircraft fire detection system is

FAST · SAFE · DEPENDABLE

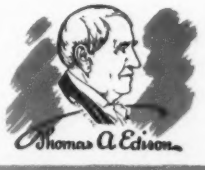
• **FAST**—will respond to flame almost immediately, regardless of ambient temperature.

• **SAFE**—the fire detection circuits carry *no* battery current *at any time*—require *no* airtight seals—have *no* moving contacts to arc. Any dangerously rapid rise in temperature causes the detector thermocouples to *generate their own e.m.f.* (measured in *millivolts)* which actuates a sensitive relay located outside the fire detection zone.

• **DEPENDABLE**—absence of moving contacts in the fire detection circuit eliminates a possibility of false alarm due to vibration. When a fire is out and conditions return to normal, these detectors signal "FIRE OUT" and are again ready to signal "FIRE" rapidly and truthfully, without need for replacement, re-calibration, or manual reset. The entire system can be tested at any time merely by pressing a button.

The Edison Aircraft Fire Detection System is used by all scheduled airlines in the United States. It does not false alarm when properly installed because thermocouple detectors signal "FIRE" only when there is a DANGEROUSLY rapid rise above normal operating temperature. The Edison Fire Detection System is rugged, simple; creates no fire hazard; and has no moving parts in the fire zones. Both wiring and operation can be checked with the push of a button.

Write for descriptive literature on design and operation. Address Instrument Division, Thomas A. Edison, Incorporated, 120 Lakeside Avenue, West Orange, New Jersey.



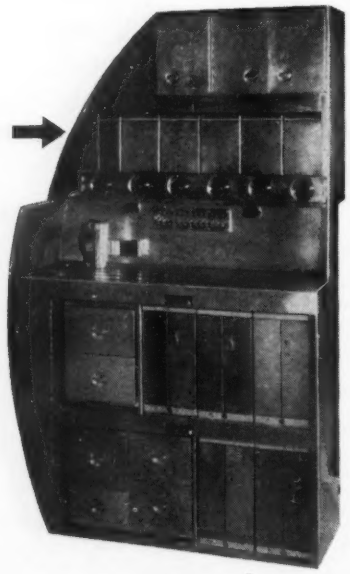
EDISON Aircraft Systems and Instrumentation

Thomas A. Edison, Incorporated, Instrument Division, 120 Lakeside Ave., West Orange, N. J.

Another PRODUCTION ACHIEVEMENT FOR EASY-FLO

FAST, ECONOMICAL FABRICATION OF STAINLESS STEEL FOOD CONTAINERS

Container has a heating unit and a cup for dry ice. Keeps liquids at 180°F or dry-ice cold. EASY-FLO joints readily take these temperature changes. Their silver content makes them every bit as ductile as the parent metals.



EASY-FLO brazed stainless steel food containers are used in most airliners. Arrow points to a row of them in the galley of a Douglas DC6.

These containers—which keep liquid foods hot or cold—are used in the galleys of airliners. Like so many other modern products, they are made principally of stampings all brazed with EASY-FLO. Like so many other manufacturers, their maker—Harrington Air Service, Inc., Mansfield, Ohio—has found the answer to fast, economical production in EASY-FLO brazing. It's the answer, because the silver brazing alloy EASY-FLO, with its low working temperature, exceptional fluidity and fast, deep penetrating action, reliably joins stainless steel stampings with all the strength and leak-tightness of the unjoined metal. It's the time and labor-saving way to join ferrous, non-ferrous and dissimilar metals.

GET EASY-FLO FACTS IN BULLETIN 12-A

Write for a copy today

HANDY & HARMAN

HANDY & HARMAN · FOUNDED 1867 · QUALITY · SERVICE

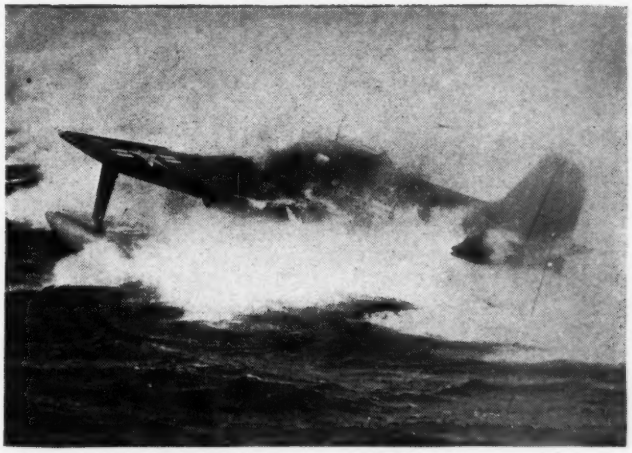
82 FULTON STREET NEW YORK 7, N. Y.

Bridgeport, Conn. • Chicago, Ill. • Los Angeles, Cal. • Providence, R. I. • Toronto, Canada

Agents in Principal Cities

Rough Water Operational Tests Conducted by Navy

Latest version of SC-2 has successfully completed last and toughest of acceptance tests—under the worst possible conditions.



SPRAY OBSCURES vision on take off in 35 mph. wind.

INITIAL IMPACT—Navy Scout lands in 5 ft. waves.

Latest version of Navy's SC-2 Curtiss Seahawk has successfully completed the last and toughest of acceptance tests—rough-water landings and take-offs under just about the worst possible conditions for seaplanes.

What happens when a 7,800-lb. seaplane becomes involved with five-foot waves and wind velocities up to 35 mph. is shown in the above series of pictures, taken during the recent tests that were run in Chesapeake Bay off the Naval Air Test Center at Patuxent, Md. At times the plane was completely covered with spray, at others, the entire wing tip would be under water. No serious damage was reported.

► **Navy Ratings**—The official Navy report on the tests gives the Curtiss plane, Wright engine and Edo floats satisfactory marks on this battering performance.

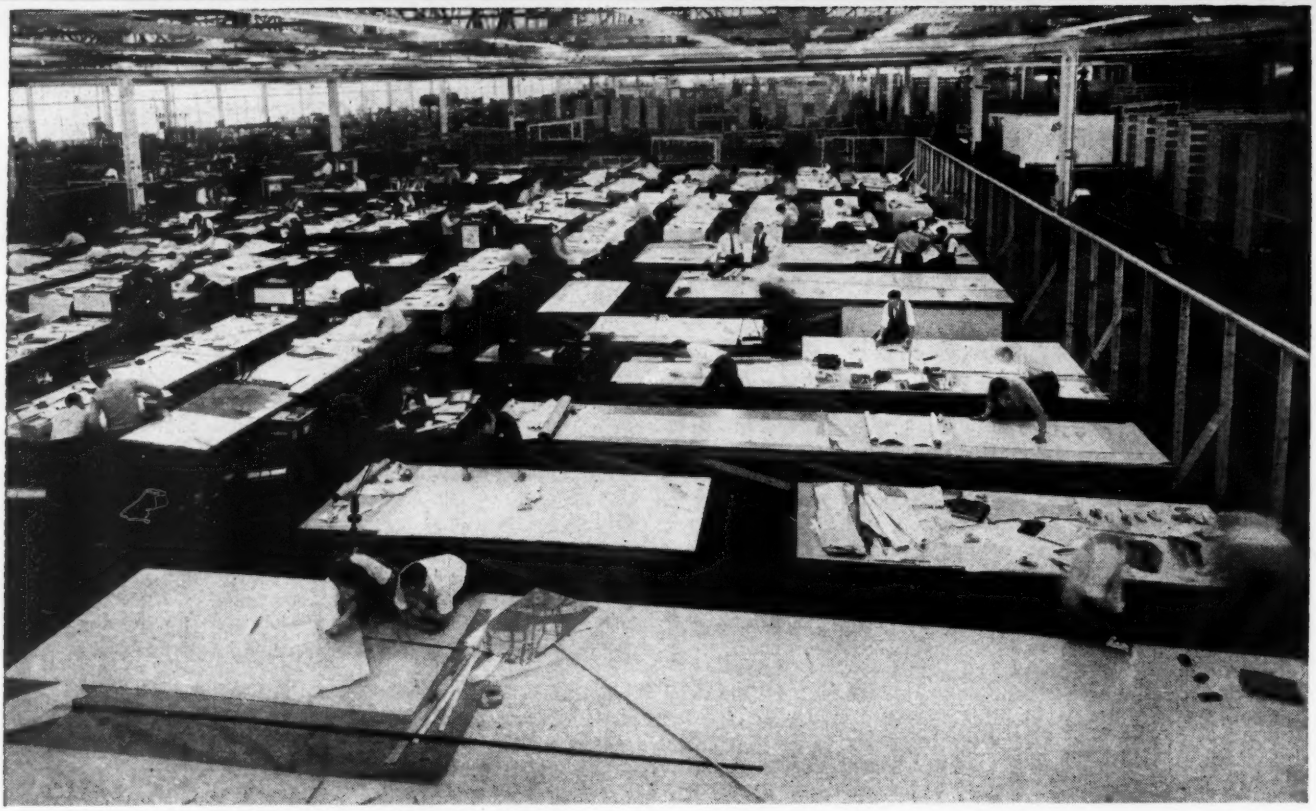
Navy's rough-water tests serve a two-fold purpose. They determine whether the airplane under study can be operated in rough water; and they also form the basis of reports which, within broad lines, can lay down operational rules for use of seaplanes off battleships and cruisers.

► **Weather Limits**—For instance, in the case of the SC-2, the results of the Patuxent trials indicate to skippers of ships off which the planes will be operated that a 35 mph. wind and five-foot waves may be the limit of bad weather conditions that this particular plane can operate in and be expected to survive.

Such conditions call for the utmost in both pilots and airplanes. Seaplanes generally are stalled on to the water in landing. If the pilot is faced with waves attaining a height of 5 ft., he might estimate he is still 4 ft. above a touch-down when actually, considering the height of the waves, he already is down. The resulting shock, when the wave hits, is considerable. It will usually bounce the plane into the air. Taxiing and take-offs present other problems, inasmuch as standard procedure most of the time is to undertake those maneuvers in the trough of the waves. Waves commonly run at right angles to the wind.

WINGTIP SUBMERGED but no damage reported.

CROSSWIND taxiing in troughs of heavy seas.



Engineering was shifted to XB-48 production site to insure close and quick coordination between these activities. Photo shows drafting and lofting sections of project group separated from shop and construction areas (background) only by open barrier.

New Expediting Techniques Proved in XB-48 Production

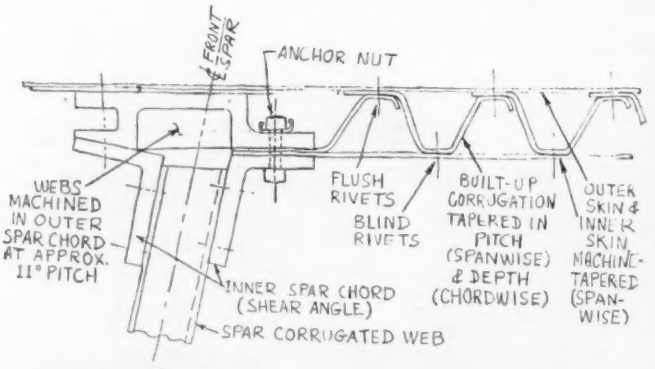
How tooling, procurement, and construction problems were overcome by Martin in fast fabrication of its large experimental jet bomber—sped by strategic placement of special engineering and production teams.

By IRVING STONE

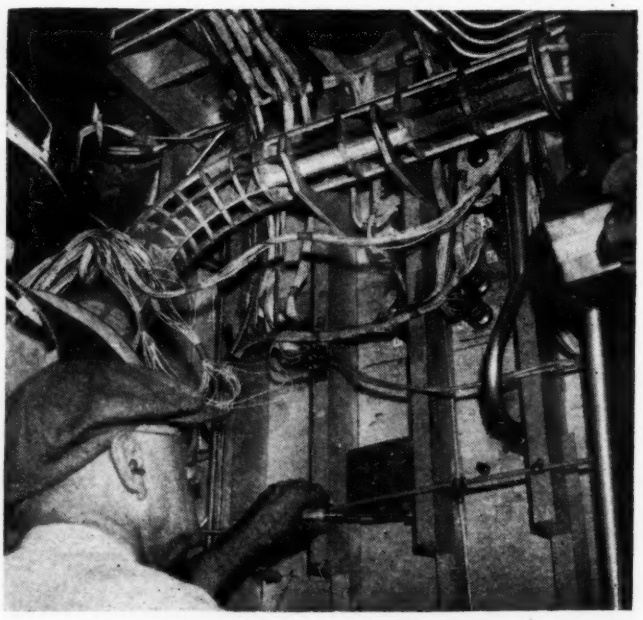
In building the high-speed six-jet XB-48 —a single-craft project—in less than 14 mo., The Glenn L. Martin Co. has set an engineering precedent for fast construction of large planes.

It is likely that Martin's procedure in this one-craft production scheme may serve as a basic pattern for rapid development of the many military single type experimental planes in our fast-changing aeronautical picture.

Following such a plan, advantages and


FRONT SPAR
ANCHOR NUT
WEBS MACHINED IN OUTER SPAR CHORD AT APPROX. 11° PITCH
FLUSH RIVETS
BLIND RIVETS
BUILT-UP CORRUGATION TAPERED IN PITCH (SPANWISE) & DEPTH (CHORDWISE)
OUTER SKIN & INNER SKIN MACHINE-TAPERED (SPANWISE)
INNER SPAR CHORD (SHEAR ANGLE)
SPAR CORRUGATED WEB

Field sketch of skin blanket cross-section, showing method of joining single corrugation sections. Added weight incurred by overlap and rivets were partially compensated by machining skins spanwise to gage of next panel outboard.



Interior of full scale mockup used for exact pre-layout of hydraulic tubing, fuel lines, wiring, receptacles, and numerous other items. When craft construction had progressed sufficiently, these installations were transferred directly to plane, saving much time. →

So clearly and unmistakably are draftsmen able to express their ideas on paper that their drawings have re-shaped the world. Through line, figure and symbol, draftsmen define the work to be done by the labor and machines of a nation. Assisting them to attain precision and clarity are drafting instruments that act almost as living extensions of their own hands...instruments that function figuratively as their partners in creating.

For 78 years Keuffel & Esser Co. drafting equipment and materials have been partners, in this sense, in shaping America, in making possible its swift-moving highway traffic, its speed in conducting business, its victorious might in war ...So universally is K & E equipment used, it is self-evident that every engineering project of any magnitude has materialized with the help of K & E. Could you wish any surer guidance than this in the selection of your own "drafting partners"?

You will find special advantages, for example, in PHOENIX* Tracing Cloth, which K & E has made almost "ghost-proof." Here is a cloth from which you can erase either pencil or ink lines without risking untidy "ghosts" on the prints, a cloth practically immune to stains from perspiration and water. You can even soak it in water for ten minutes at a time without harm! For further details about PHOENIX* Tracing Cloth, write on your letterhead to Keuffel & Esser Co., Hoboken, N. J.

partners in creating

*REG. U. S. PAT. OFF.

...the world's greatest highways
...best known calculators
K+E
Drafting, Reproduction, Surveying Equipment and Materials. Slide Rules, Measuring Tapes.
...newest rockets
KEUFFEL & ESSER CO.
EST. 1867
NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • DETROIT • SAN FRANCISCO
LOS ANGELES • MONTREAL

Many more miles per manifold...

All the Army's serviceable C-54's will soon be equipped with Solar exhaust manifolds . . . replacing former equipment. Solar's commercial version (tailpipes added) will soon be available to airlines for their DC-4's. There are at least 10 outstanding reasons for this acknowledgment of Solar's superiority:

1. Solar-built exhaust systems have fewer moving parts . . . none on the C-54 . . . 1 per engine on the DC-4.
2. Longer life and lower maintenance cost.
3. Only 5 sections accommodating all 14 exhaust ports.
4. Maximum of 5 accessible bolts per section.
5. The thrust from the exhaust, emitted at higher velocity, increases the speed of the airplane.
6. Smooth port leg fairings eliminate hot spots.
7. Manipulation of only 19 parts for complete installation per airplane.
8. All sections (except 2 outlets) interchangeable on the 4 engines.
9. Weighs only 66 lbs. per engine (including extended tailpipe).
10. A decreased heat transfer area and reduced leakage keep engines cooler.

For complete engineering details write or call Solar...also makers of component parts for jet and gas turbines and guided missiles.

10 reasons for replacing with Solar Exhaust Systems . . .

SOLAR Aircraft Company

San Diego 12, Calif. • Des Moines 5, Iowa • 331 Mutual Home Building, Dayton 2, Ohio • 60 E. 42nd St., New York 17, N. Y.

shortcomings of designs could be quickly determined, affording valuable information for constructing craft of similar specifications, without the need for slow and expensive tooling preparations involved in normal production schedules.

▶ **Engineering-Production Coordination**—For the single XB-48 project, selected engineering personnel (peak force was 137) from Martin's staff were moved from their usual segregated quarters directly to the production floor. Also established at this location was a separate accounting section. Site for construction of the aircraft was but a few hundred feet from the project area. A special raw stores department was set up, and material brought in via plane and truck from distant points, thus cutting many weeks from time required for normal ordering schedule.

Detail drawings were not released until it was ascertained that material for parts were available, and first parts were fabricated within one week after initial engineering drawings were released. Backlog of details released was not allowed to exceed 4,000 (34,000 constituted total number for the craft) to insure efficient coordination between engineering, shop, and assembly, with engineering maintaining a six-week lead on production.

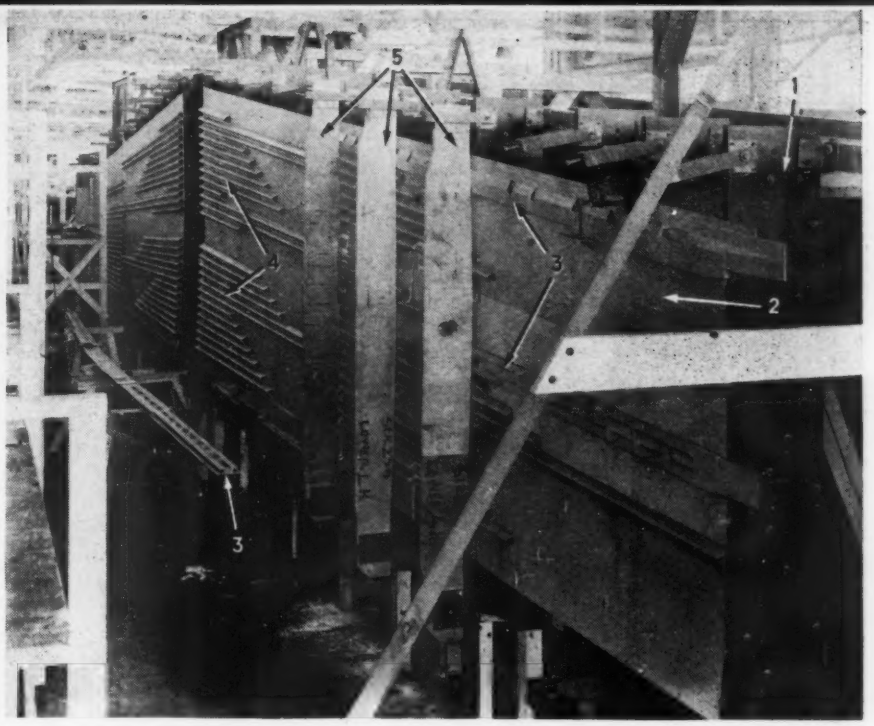
Normal routing through engineering, procurement, and production was frequently eliminated. With a simple sketch for a special part, the engineer would go to the adjacent shop and discuss fabrication details with the mechanic, work commencing almost at once if no additional tooling were required. If special tooling were needed, details were worked out immediately by engineer, mechanic, and tool designer, the tool drawing being routed directly to the shop for fabrication. When the part was finished it was taken to assembly for installation, or to storage until needed.

Weekly meetings between heads of engineering, production, tooling, manufacturing, and planning considered current and anticipated problems. And through this close coordination, special tooling and fixtures were eliminated wherever possible, acceptable substitute materials were selected, short-cut methods worked out, and additional personnel assigned to eliminate bottlenecks.

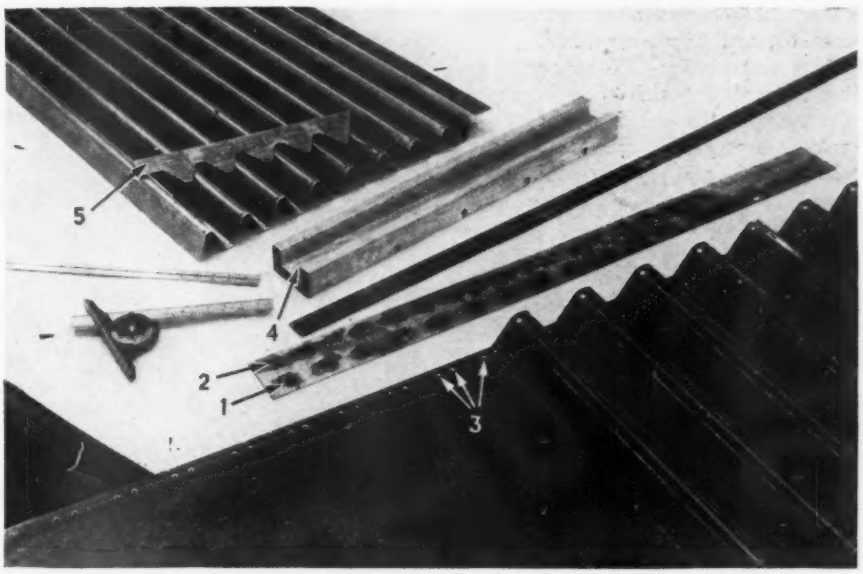
Here are some of the unorthodox—but effective—methods adopted at Martin to solve problems that generally confront the aircraft manufacturer in normal production schedules:

▶ **Mockup Utilization**—There is a serious production difficulty when the various group mechanics try to install equipment simultaneously in cramped quarters. To avoid this time-consuming condition, also to eliminate waiting for completion of the aircraft structure, a full scale wood mockup of cabin and forward wheel bay was constructed, since these were particularly equipment-congested areas.

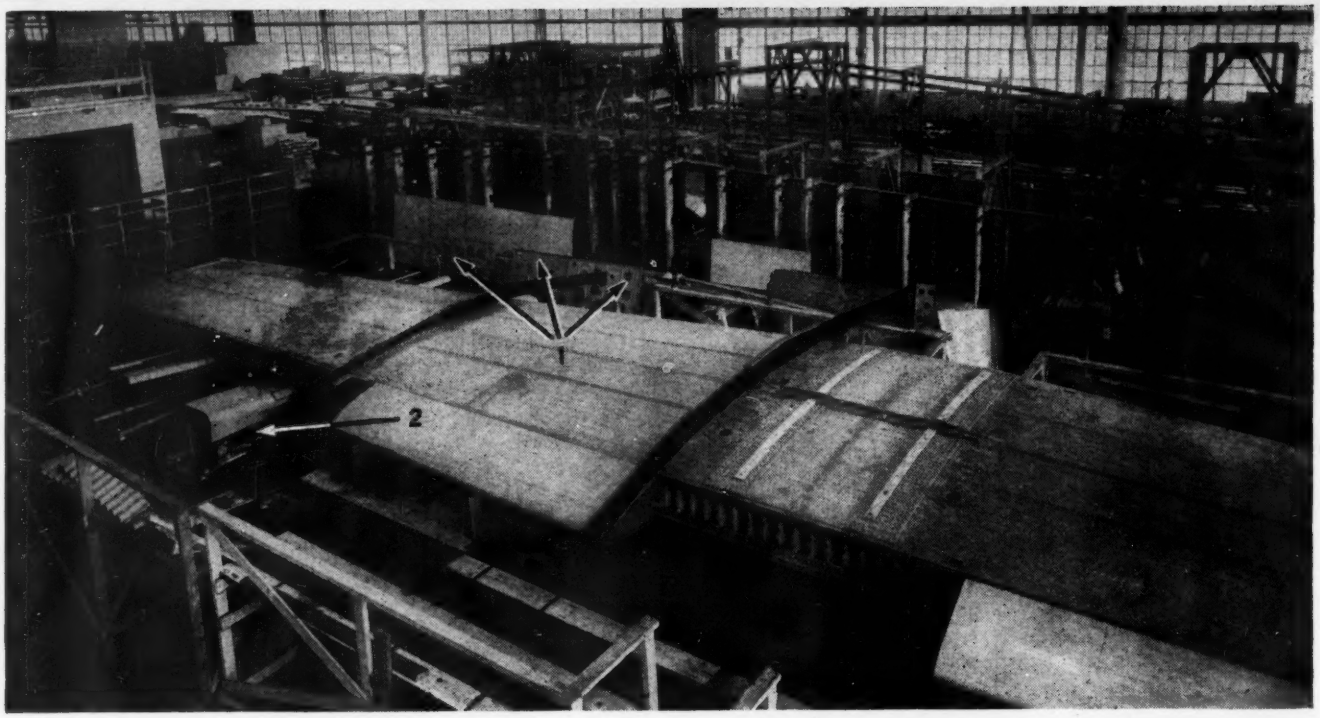
This gave group engineers an opportunity to have numerous sections of various systems prefabricated and fitted to the exact scale mockup under conditions simulating actual installation in the finished craft. Thus, when the craft structure had progressed sufficiently to receive equipment, the mockup installations were removed and transferrred directly to the airplane. Equipment so installed on the mockup included electric wiring, hydraulic and pneumatic tubing (complete with bends and unions), fuel lines, linkages for flight and engine con-



Center wing lower blanket. Butt joints of individual corrugation sections were staggered to use stringers formed on 12-ft. brake meet splice points 15 ft. apart. Details are: (1) Masonite skincontour headers, (2) outer skin, (3) spar chords, (4) corrugation sections, and (5) clamps for holding parts to contour headers.



Tapered corrugated sheet as formed by the hole-and-pin method on press brake, for second XB-48 project. Stretch-out development of centerline of each bend radius is laid out on template, layout being computed from engineering drawing of complete corrugated sheet. Holes to fit locating pin in brake die are drilled on each radius centerline, those on one edge of template for radius spacing of corrugated sheet inboard end (1) and on other edge (2) for outboard end. Template is placed on flat sheet and holes drilled distance between centers approximately 4 in. greater than finished length of sheet. Pins in brake V-die are spaced to accommodate drilling, and clearance holes for pins are drilled in punch. Sheet is then placed in brake with holes (3) located on pins in die for each bend. Two bends are made each time sheet is turned over. With sheet end held flat in block recess (4), another template (5) is used to check pitch, depth, and angle. Sheets are then sawed to finished length, removing holes used in forming.



Center wing box, with contour board for locating leading and trailing edges. Nacelle frames are at (1), bypass tunnel skin dummy at (2).

trols, fire control mechanisms, radio, instrumentation details, and seats. Wood models were used for cabin ventilation, anti-icing, and supercharging ducting, and then utilized to form actual ducting installations. Even miscellaneous items such as map case, first-aid kit, and thermos bottle were installed. Points of equipment-interference were caught early, and in addition to time saved by this pre-layout method, reworking was minimized on the production line.

▶ **Wing Construction**—Because of the thin wing required and high wing loading involved, double top and bottom skins were employed sandwiching trapezoidal corrugated stiffeners tapering in pitch (spanwise) and in depth (chordwise).

Ruled out was normal procedure for obtaining these corrugated sections—having dies built and sheets formed to required lengths and widths—since this would have delayed the project at least six months.

The 12-ft. brake in the plant couldn't be used to form the corrugations because it wasn't sufficiently long to fabricate the sheet span between splice stations. Shorter sheet lengths couldn't be spliced longitudinally because of added weight and stress factors.

Method finally adopted for constructing the corrugated sheet was to lap and rivet successive single corrugated sections tapered and decreased in gage from root to tip. Though this involved the weight penalty of metal overlap and rivets, the process was considered a substantial time-saver when the project was in the initial, one-project stage.

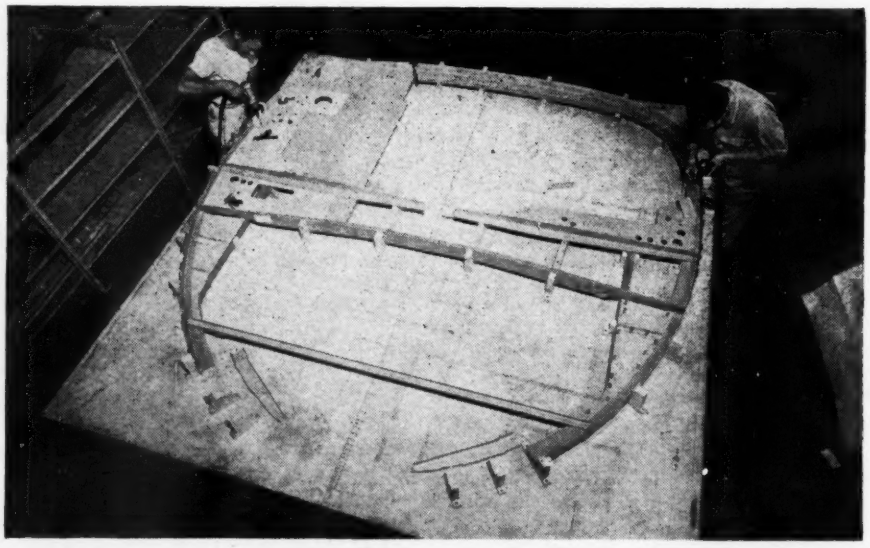
For the second XB-48 project, now under way, a brake of sufficient length was obtained to fabricate overall corrugated sheets. Bend points are determined by locating holes via stretch-out development on the flat sheet. Successive bends are made first on one side of the sheet, then on the other, over the entire sheet width.

Instead of using wing skins with panel continuous thickness decreased in successive spanwise panels, both inner and outer coverings were machined in the flat sheet from one thickness to that of the succeeding panel—as from .187 to .125; from .125 to .050. This afforded considerable weight-saving, and compensated in part for the additional weight involved in overlap and riveting of corrugated stiffeners.

Close tolerances required on the airfoil contour dictated departure from usual method of building spar assemblies, so as to eliminate accumulation of tolerance errors. The erection process also simplified considerably usual tooling problem.

Vertical fixtures were erected with Masonite-sheet headers cut to outside skin contour. Wing components were then applied in this order—outer skin, splice plates, corrugation (stiffener) sections, spar chords, inner skin, and spar web shear angles.

During this assembly, splice plates, corrugation crests, and outer skin were drilled through, holes cleaned, and riveted. Spar chords were drilled and temporarily bolted.



Expensive tooling was avoided and time saved by using nested master lines lofts for assembly of frames, bulkheads, ribs, etc. Loft was fastened to flat table, and hardwood blocks for locating chords and other details were fastened along mold lines at station for particular assembly. As assembly was completed, other blocks were placed at another station for different assembly. Thus, single table could be used for many different assemblies merely by changing blocks. Engineering saved much time by eliminating detailed lofting, simply supplementing master lines loft with drawings (mostly free-hand) of assembly.

INTERCHANGEABILITY

3/8 TUBE SIZE
1/2 TUBE SIZE
Basic Valves Alone (Manual Operation)
Basic Valves with Remote Hydraulic Actuators
Basic Valves with Positioning (Follow-up) Control
Basic Valves with Geneva-lox Electrical Actuators

In addition to the eight 3000 PSI units shown, there are 12 similar combinations available for 1500 PSI systems.

—An Exclusive Feature of All Bendix-Pacific Hydraulic Selector Valves and Actuators...

These combinations of electrical, hydraulic and positioning actuators in combination with standard Bendix-Pacific 4-way valves are only part of the 20 valve-and-actuator combinations for both 3000 PSI and 1500 PSI systems available *now* from Pacific Division.

Each of the three types of Bendix-Pacific actuators shown in the illustration above is interchangeable on either the ⅜ TS or ½ TS standard Bendix-Pacific 3000 PSI valves. The value of such interchangeability in a hydraulic system is evident in three important advantages to you—easier procurement—cleaner installation—simplified service.

Only Bendix-Pacific selector valves give you this flexibility. Phone or wire us today for accurate information on any specific item.

PRODUCT OF Bendix AVIATION CORPORATION

Pacific Division
Bendix Aviation Corporation
NORTH HOLLYWOOD, CALIF.

East Coast Office: 270 Park Ave., New York 17, New York. - Canadian Distributors: Aviation Electric, Ltd., Montreal

YOU CAN GET

REVERE QUALITY

IN ALUMINUM TUBES

AND EXTRUDED SHAPES

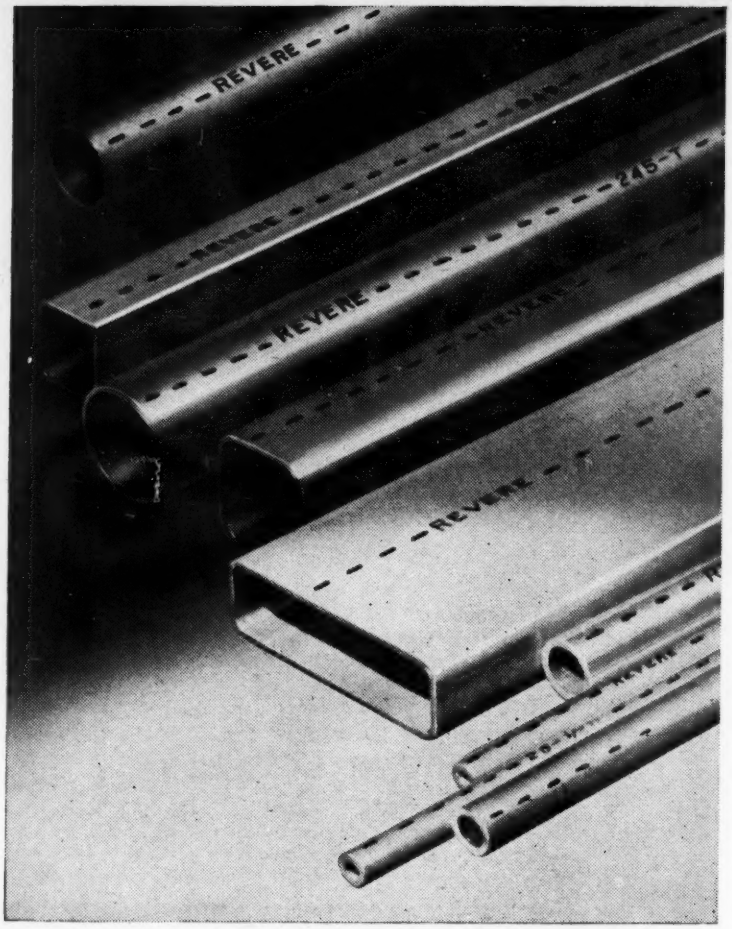
★ ★ ★

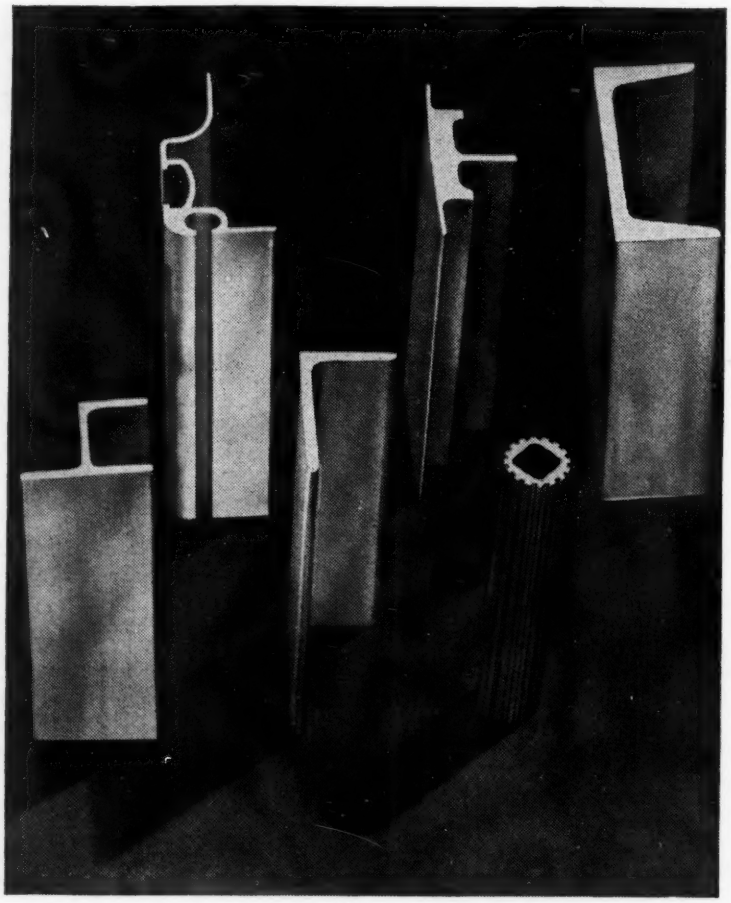
THE high standard of quality and service that has been characteristic of Revere for nearly a century and a half is your assurance that Revere is a dependable, cooperative source of supply for your aluminum tubes and extruded shapes.

Revere produces aluminum alloy tubes in a large range of sizes, from ¼" O. D. to 3½" O. D. and in many wall thicknesses. The aluminum alloys available are 2S, 3S, 4S, 24S, 52S and 61S. The heat-treatable alloys 24S and 61S can be furnished in either the soft or heat-treated condition. The other alloys can be furnished annealed and in various tempers. Revere aluminum tube is used in aircraft and automobiles wherever strong, light-weight, corrosion-resistant tubing is required.

Revere aluminum alloys can be extruded to your designs in an infinite variety of shapes suitable for many applications. They can help you simplify difficult design problems and drastically reduce your fabricating and assembly costs.

The Revere office nearest you will be glad to give you more complete information about Revere aluminum tubes and extruded shapes as well as technical assistance in their application.





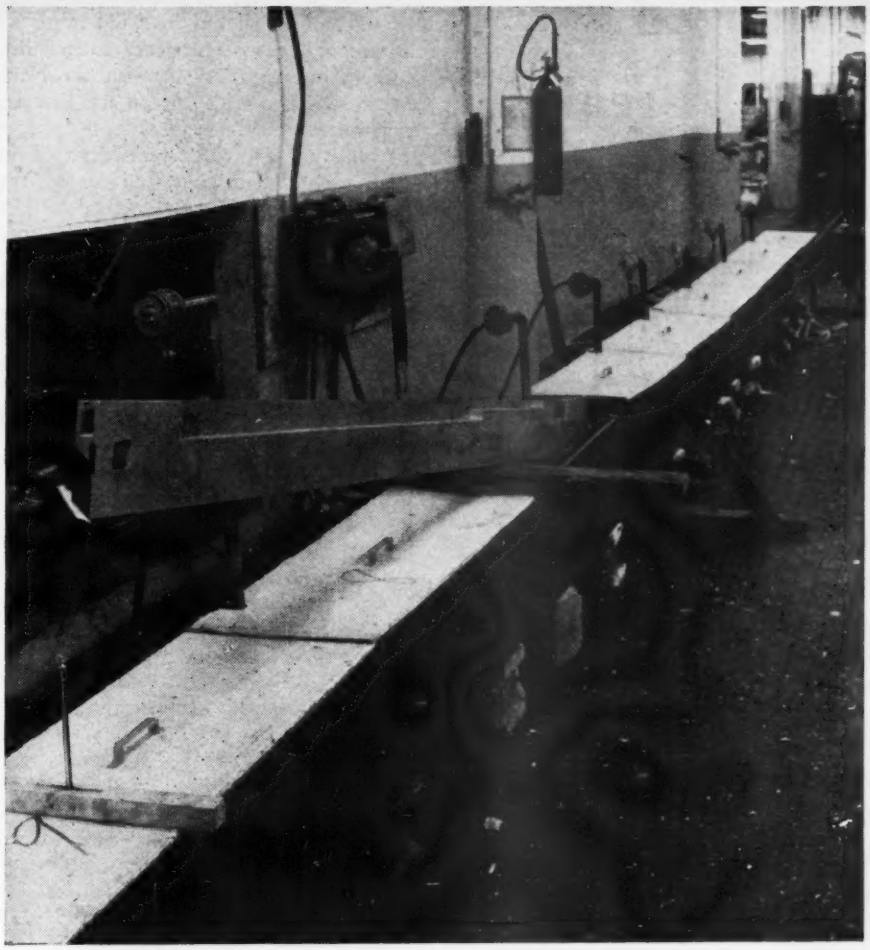
REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.



This tank, together with electrical controls, was built and in operation within 24 hr. after decision was made to facilitate bending of spar chords by first heating in oil bath.

Inner skin was applied, drilled through corrugation lower crests, and holes cleaned. Inner skin was then removed, spar chord permanently bolted with flush-head units, and skin next applied with blind rivets. Spar web shear angles were bolted through inner skin, spar chord, and outer skin.

This lower blanket assembly was then removed from the vertical fixture and placed in Masonite headers of horizontal fixture. Spar webs were then placed between shear angles and drilled and bolted in position. Wing ribs were attached between spars on lower blanket, without upper rib chords in place. Upper blanket was lowered on to spar webs and upper contour headers tied to lower headers to hold blanket firmly. Holes were then drilled through spar webs for bolted attachment of upper blanket shear angles. Upper chords of ribs were located and fastened to upper blanket and ribs. (Ribs had removable webs for access to inner portion of wing box.)

▶ **Short-Cuts**—To avoid delay of many months involved in outside fabrication of spar and fuselage bulkhead chords, Martin bought bar stock and machined these components. This was considered an advantageous method for single-craft production, and cost compared favorably with that for outside procurement, considering expense of special dies and minimum order quantities.

To facilitate framing of fuselage crown over center wing, a tool in the form of a dummy wing section was built for use in fuselage fixture. This avoided waiting until actual wing center section was ready for assembly to fuselage. Dummy wing section also served to locate wing-to-fuselage attaching fittings. In addition to time saved, extensive tooling costs were eliminated.

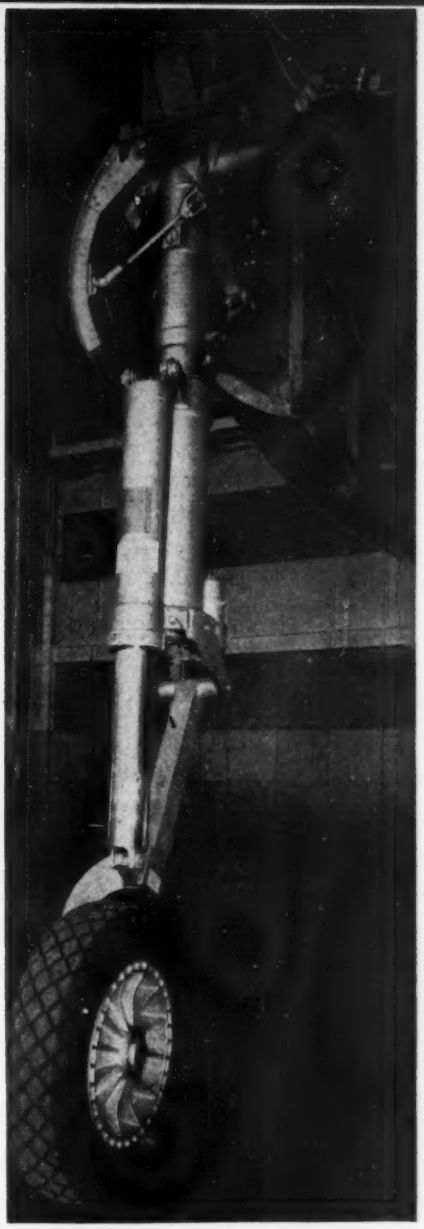
In another instance, a dummy was formed to obtain contour of bypass tunnel skin between power plants. After skin was formed, dummy was further utilized as part of the fixture to build up the nacelles and nacelle door assemblies.

Minor difficulties which might have caused delay were also anticipated. Thus, tolerances of flush-head screws used in the wing were pre-checked in a simple plate gage simulating the skin installation, to insure that these units would not protrude.

Difficult drilling of large-size close-tolerance holes through spar chords, shear angles, corrugation, and skin of the second XB-48 wing assembly has been simplified by adapting a drill press to the process. With the wing in horizontal position, the drill press is roller-mounted on tracks (I-beams) and supported by the wing contour headers, so that the drill is always normal to the surface.

▶ **Fuel Cell Installation**—An interesting design feature is found in the structure arrangement permitting rapid removal of the eight fuel cells. Four of these units run from front to rear over the bomb bay; also, two cells are located one behind the other, in each wing, between fuselage and nacelle. Each end cell in fuselage rests on a removable floor to permit withdrawal through bomb bay.

The two center fuselage cells are drawn through removable bulkheads, so that each can be drawn into an end cell area, then down through bomb bay. Wing tanks are pulled inboard through removable ribs, down through opening in lower wing, and through bomb bay.

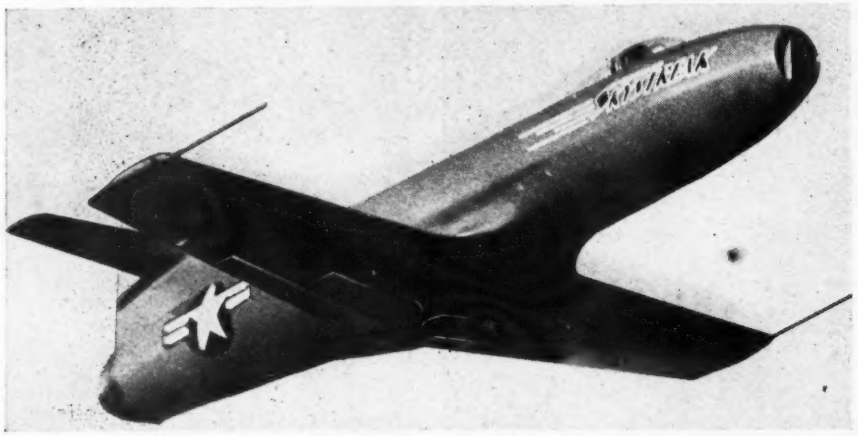


Wing gears are light balancing units mounted outboard of nacelles to afford stability during taxiing, takeoff, and landing. Gear is full-castering, retracts into narrow bay. Small door is attached to strut, and larger door (seen open at rear) is closed except during gear extension or retraction. Main gear comprises two tandem-type double-wheel units retracting into fuselage.

Escape Method Developed For Douglas D-558 Skystreak

Free fall of nose section to carry pilot safely out of transonic speed ranges prior to bail-out.

By R. C. DONOVAN, *Project Engineer, Douglas Aircraft Co.*



Douglas Skystreak in flight.

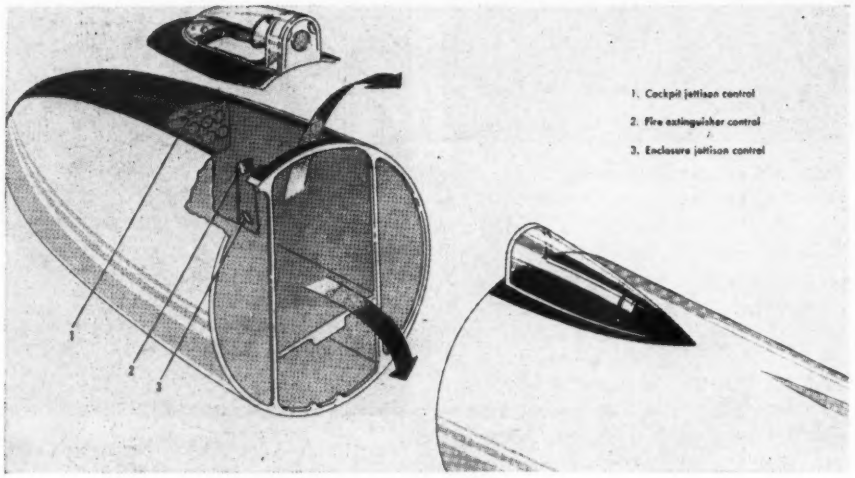
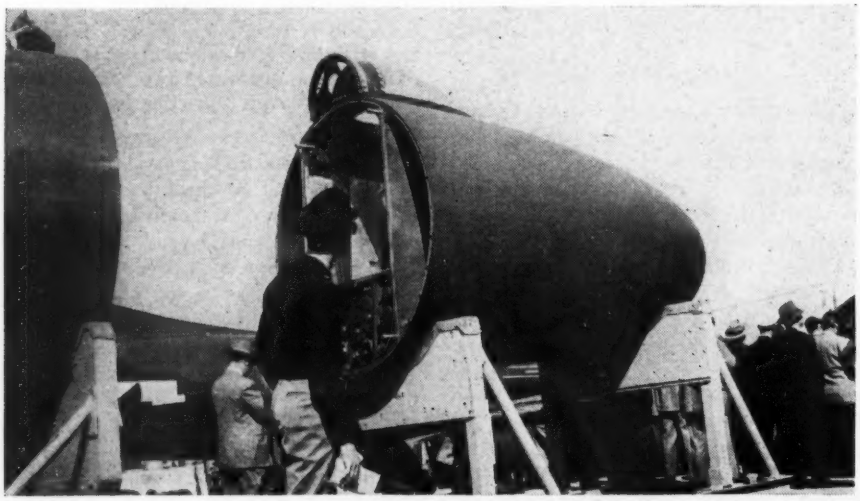


Diagram shows portions jettisoned and position of release controls.



Nose section detached; this portion falls free.

Safety provisions, as transonic velocities increase, for the pilot of the D-558 Skystreak in case of extreme emergency entered discussions early in 1945 between the Navy Bureau of Aeronautics, NACA and Douglas engineers.

While no difficulties were expected in pilot egress at subsonic speeds, as the normal cockpit bailing out method used in combat was to be employed, numerous ideas were discussed concerning transonic safety exit for the pilot. It was evident that direct bailing out into the transonic air stream would be unfeasible.

▶ **Escape Device**—The most logical solution seemed to be release by the pilot of a suitable enclosure which would fall free and slow down to a speed that would safely permit him to bail out.

Consideration was given to slowing the nose compartment during its free fall by parachute or dive brakes. Both were discarded due to structural difficulties in the case of dive brakes and because a suitable chute that would successfully open at high speeds was not available. Another method, to which only minor consideration was given, was that of having pilot and seat remain attached to rear portion of fuselage after nose was jettisoned; because of danger of possible nose collision and the fact that remainder of plane would probably react in an abrupt nose-up at the moment of c.g. change, this suggestion was discarded.

Investigation of present method indicated that nose compartment would probably slow down to about 300 mph. without any decelerating devices, and that it would be satisfactory to bail out at this speed, since some protection was afforded at moment of egress.

▶ **Design Details**—Design finally chosen evolved into a mechanical fastening of pilot's compartment to remainder of fuselage by means of four bombrack-type hooks. These were designed to operate mechanically by a pull handle located above center of instrument panel. A 60 lb. pull on handle completes, successively, a two-seconds decompression of the pressurized cockpit and release of bombrack hooks. The two-seconds decompression is deemed sufficient to preclude serious effects of an "explosive" decompression in releasing the nose section.

Once clear of the plane, and with falling speed sufficiently reduced, the pilot bails out by pulling a cable handle located against right sidewall of cockpit approximately at hip location. A 10 lb. pull on the handle simultaneously releases pilot's backrest and shoulder harness fastenings, allowing him to move or fall out of rear of cockpit.

Should speed of airplane be below that indicating a nose-breakaway escape, pilot can jettison bubble canopy section by a 20-30 lb. pull on cable handled also located on right side of cockpit near knee level.

An unusual problem was presented in the requirement of a quick disconnect system for controls leading from nose section into after airplane structure—both surface controls and engine controls.

It was deemed impractical to attempt to

Dependable Heating for every Aircraft need

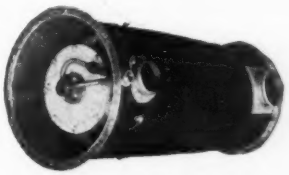
The Janitrol heaters shown above range in sizes from a 15,000 Btu unit to models with capacities in excess of 300,000 Btu's per hour.

EACH of the Janitrol Whirling Flame Heaters you see above was designed for some particular size and type of plane. Each plane has different performance standards. Each requires different heater control combinations to attain the highest heating efficiency under varied altitudes, plane speeds and flying conditions.

In designing various adaptations of one basic heating principle . . . the Whirling-Flame . . . by originating such developments as fuel pressure regulation, the fuel injection system and the use of spark ignition . . . Surface Combustion engineers have answered very nearly every practical heating requirement of modern aircraft transportation.

This knowledge and experience has resulted in building up the Janitrol standard aircraft heater line—to provide dependable heat at low maintenance cost for any plane now in service.

The interchangeability of Janitrol service parts and control assemblies simplifies service work and the stocking of parts for maintenance. These are added reasons why so many of the major airlines and airframe manufacturers use Janitrols exclusively.



• S-200 Janitrol delivers over 200,000 Btu's per hour. Can be equipped for pressurized use and for single or dual ignitions. Uses the same ignition assemblies and control components used on other Janitrols installed in most leading airlines.

Janitrol

AIRCRAFT and AUTOMOTIVE HEATERS

with the whirling flame

AIRCRAFT-AUTOMOTIVE DIVISION • SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO

Three-passenger Piper Cub Super Cruiser—an ideal ship for a family that wants to go places quickly, safely and economically.

Both are leaders in their field!

PIPER among light planes . . .
Pittsburgh's AEROHIDE among Aviation Finishes!

BEST PROOF of the quality of Pittsburgh's Aerohide Aviation Finishes is the company they keep.

For example: These coatings contribute much to the utility and durability of various Piper ships which have held leadership in the light plane field for many years.

There's good reason why such outstanding builders turn to Pittsburgh for finishes that are exceptionally durable and good-looking. These finishes are the result of a leadership in paint-making which derives from intensive research, wide experience and a system of quality control unmatched in the industry.

Aerohide finishes provide greatest protection against corrosion of metal parts, warping and weathering of wood and deterioration or loss of tautness in fabric. They help to maintain structural safety.

Their bright, lasting colors add to visibility at the same time that they enhance beauty of design.

We'll be glad to send you on request our new booklet describing the complete line of Aerohide Aviation Finishes and containing large color chips. Call on us for advisory service. Our broad experience in this field often can save you time and money!

PITTSBURGH PLATE GLASS COMPANY
Industrial Paint Division, Pittsburgh 22, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, California; Portland, Oregon. Ditzler Color Division, Detroit, Michigan. The Thresher Paint & Varnish Company, Dayton, Ohio.

Pittsburgh Aerohide Aviation Finishes

Protective Coatings for fabric, metal and wood surfaces . . . Zinc Chromate Primers for metal . . . Lacquers, Clear and Pigmented . . . Dopes, Clear and Pigmented . . . Primers and Sealers for Plywood . . . Paints . . . Spar Varnishes . . . Heat-resisting Enamels . . . Slushing and Sealing Compounds for fuel tanks . . . Caulking and Glazing Compounds . . . Fabseal Impregnated Tape . . . Chromseal Tape . . . Stratoseal Cabin-sealing Tape . . . Army and Navy Specification Finishes.

PITTSBURGH *Industrial* **FINISHES**

PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

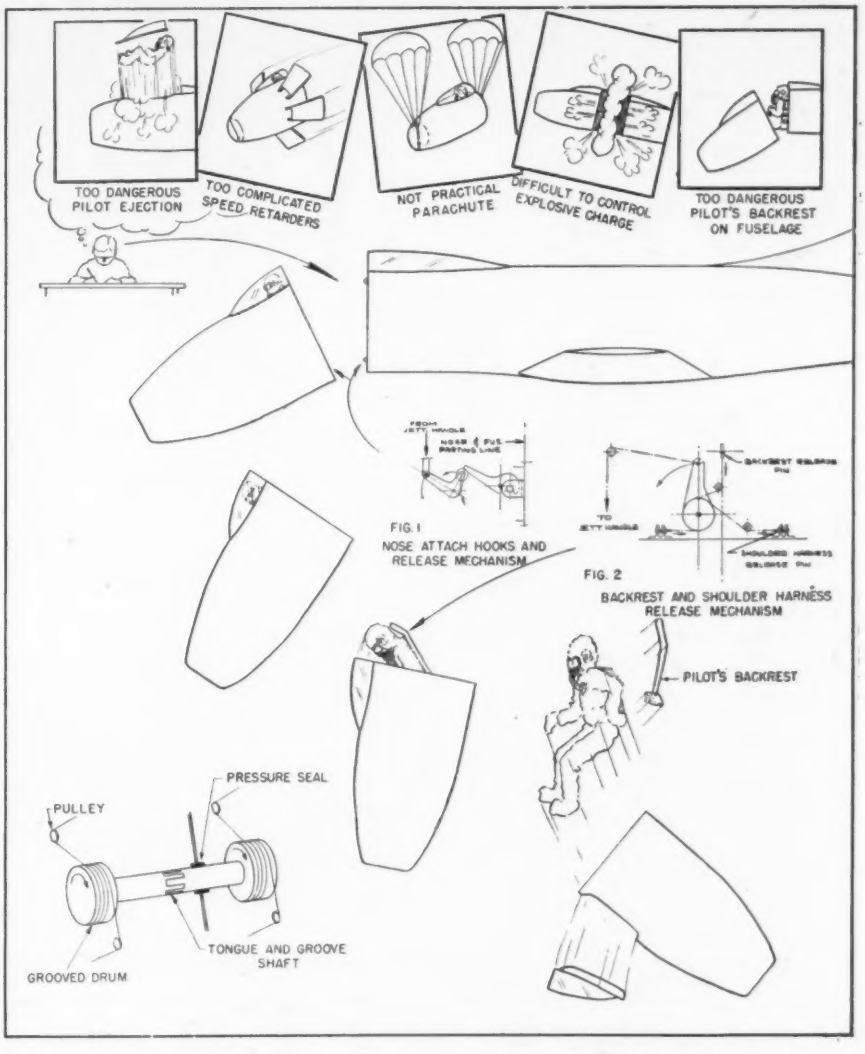
Photos show two methods of leaving nose section after emergency detachment. At left pilot rolls out. At right pilot backs from cockpit.

pass control motions through the pressurizing bulkhead at rear of cockpit (bulkhead being an integral part of airplane structure) by means of push-pull tubes mounted in pressure seals. Instead, control cables in nose section were lead to small drums mounted on steel shafts piercing pressure bulkhead and carrying similar cable drums at their after ends in non-pressurized airplane structure. Thus push-pull motion of cockpit cables was transformed to rotary motion at bulkhead and restored to cable motion on the other side. The transmitting rotary tube in each case was built in two sections with tongue-and-groove joints to transmit torque loads while being free to separate without tension load upon release of nose section. Electric controls passing through the bulkhead were equipped with pullout plugs.

▶ **Characteristics Studied**—NACA is now conducting tests on stability of a full-scale nose in the free fall condition and is also conducting small-scale tests to reproduce the jettisoning in high speed flight. Tests were also made in altitude chamber with pilot in cockpit of the Skystreak so he might obtain experience with anticipated occurrences should he be forced to use this method of escape at high altitude. These tests were concluded satisfactorily.

Due to cautious "inching-forward" nature of the flight research program into the transonic range, the jettisonable escape hatch is not expected to be used. It affords the pilot a super-safety provision as a last resort method of egress.

The careful approach to this problem is consistent with traditional policies of the Navy Department and the Douglas Company in affording every possible protection to pilots flying their airplanes.



Steps required to accomplish nose jettison escape. Top row depicts rejected methods which came under consideration. (Sketches by Bill Morgan)

Yes Sir, . . . here's
UNITED STATES

alloy steel in *ANY form your heart desires!*

. . . and in ANY analysis . . . in ANY heat treatment . . . in ANY size . . . and to HIGHEST quality standards

THAT seems like a pretty big order. But we are prepared to fill it. Because we are completely equipped to meet ALL your alloy steel requirements.

• If you need forging ingots, blooms, billets or slabs . . . square bars, round bars, coiled bars, spring flats or special sections . . . plates, sheet, strip, sketch plates or structural shapes—

• If you use bearing steels, aircraft steels, gear steels . . . Nitralloy steels . . . regular or special analysis alloys—

• If the steel must be quenched and tempered . . . regular or spheroidized annealed . . . normalized . . . stress relieved or tempered . . . or needs other special heat treatments—

• If you want it hot rolled . . . in straight lengths or coiled . . . machine or gag straightened . . . flattened . . . machine, cracker or torch cut . . . pickled . . . sand blasted, oiled or limed—

Whatever your specifications call for—we can provide.

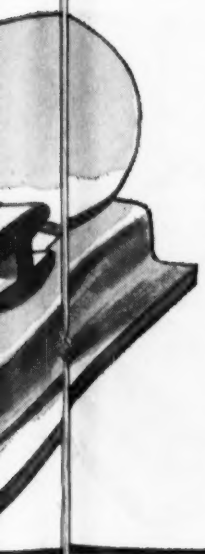
• • •

Complete alloy steel producing and finishing facilities, both in Pittsburgh and Chicago, make it possible to expedite deliveries—to reduce shipping time and cost—to give you not only the finest alloy steel produced, but exactly as you want it, no matter where you are located.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York
7-708



Did you know?

. . . That no other single producer can offer, or equal, Carnegie-Illinois Steel Corporation's versatility of alloy steel production.

. . . That much of the major contribution Carnegie-Illinois was able to make in the development of the National Emergency Steels was based on the valuable research previously done in our laboratories—notably in the field of hardenability.

. . . That Carnegie-Illinois added new electric furnace plants in both Pittsburgh and Chicago districts to produce qualities suitable for aircraft engine parts as well as large quantities of bars for aircraft tubing and antifriction bearings.

U·S·S Carilloy Steels

USS STEEL — UNITED STATES STEEL

ELECTRIC FURNACE OR OPEN HEARTH

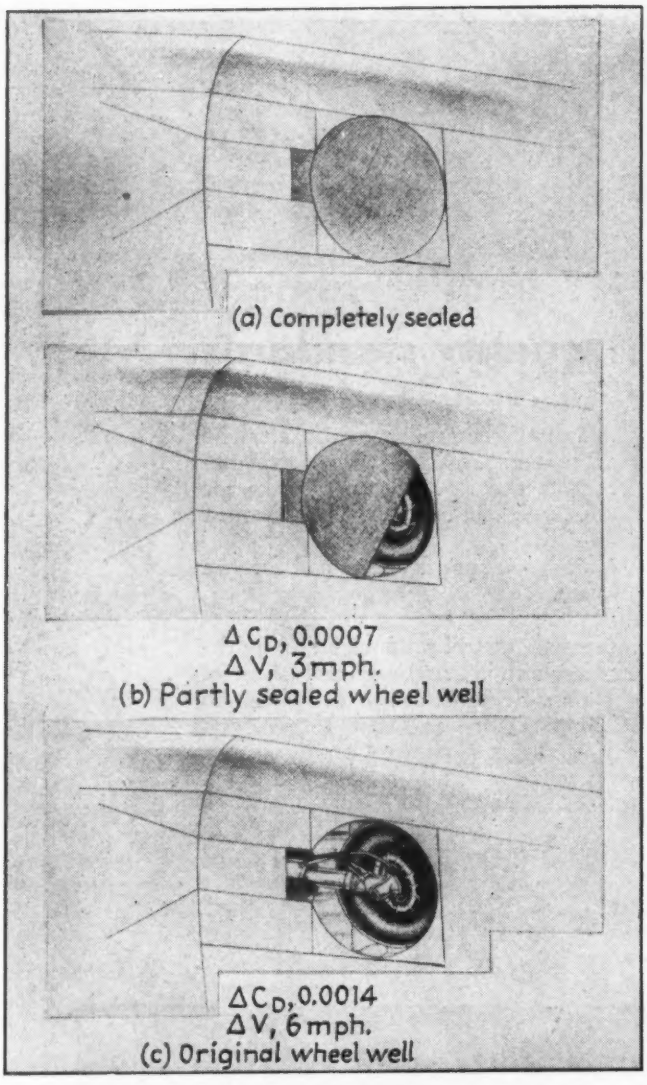
COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

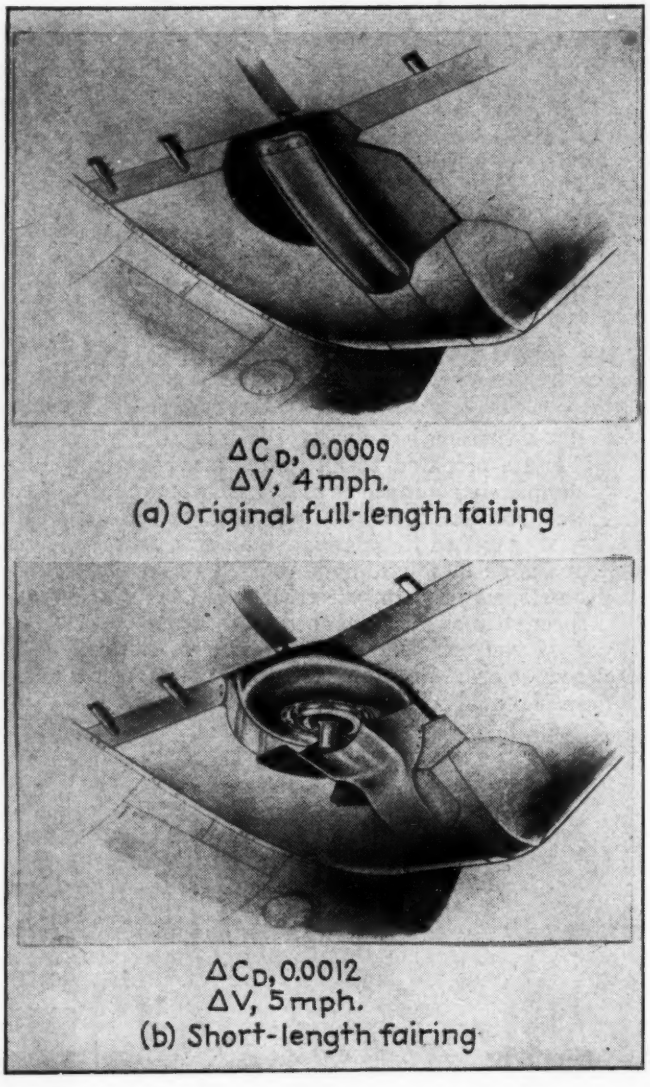
S T E E L

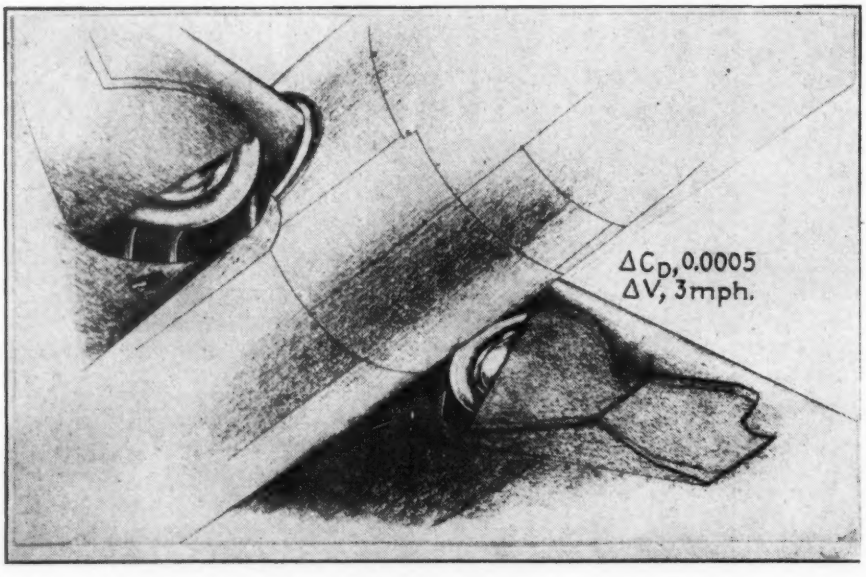
Searching Drag Studies Check Speed Impeders

Outlined are investigations of three landing gear installations — detailing effects of full and partial sealing of wheel well, and sealing of fairing edges.

Part V



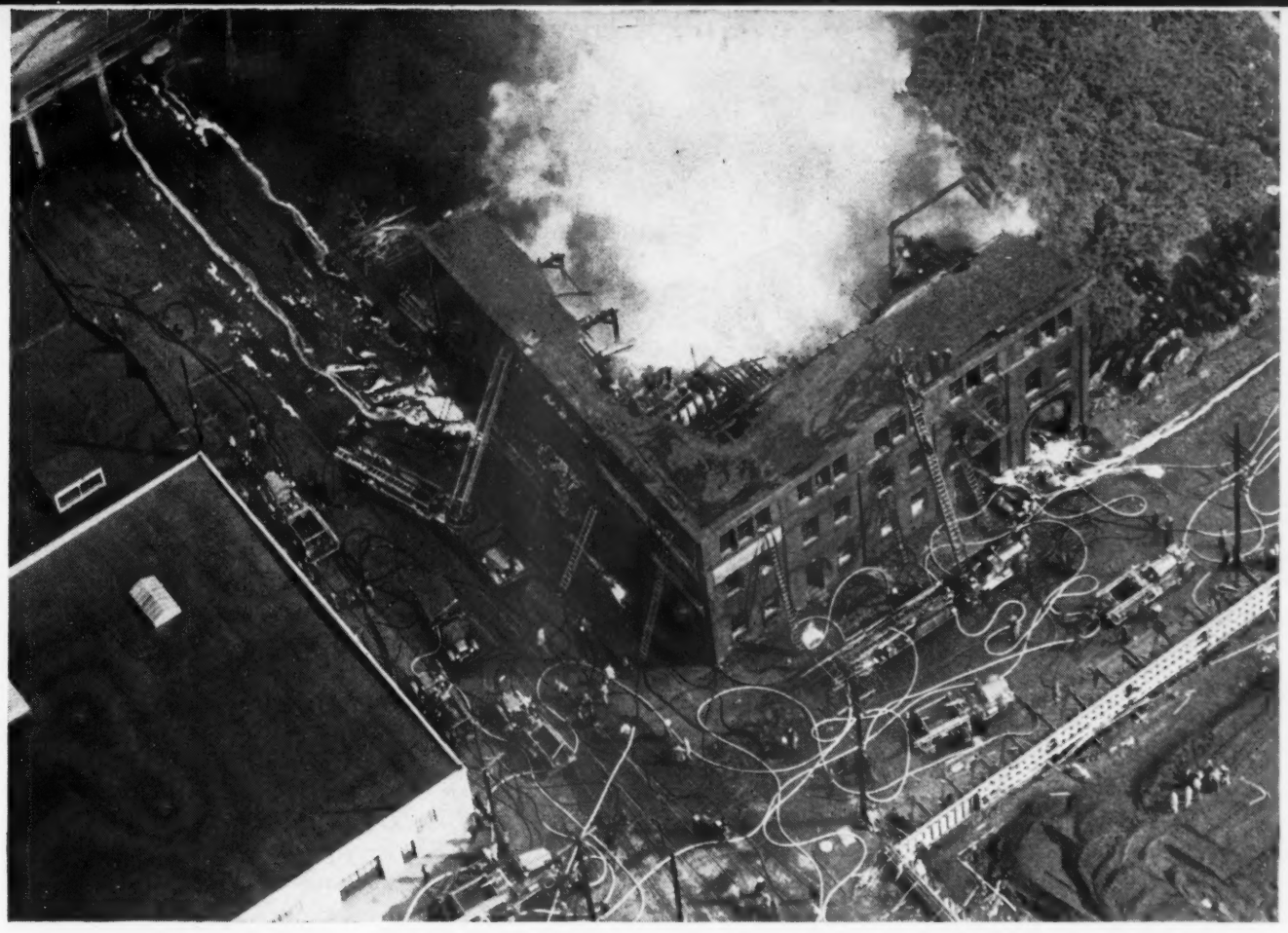




High drag of installation at upper left indicates importance of sealing open wheel wells. Complete sealing of well decreased drag coefficient by 0.0014, and partial sealing decreased coefficient by 0.0007.

Partly open wheel wells on this craft (left) accounted for drag coefficient increment of 0.0005—measured when cover plates were removed from exposed section.

Removal of seals from edges of original full-length fairing (upper right) over retracted landing gear on this plane increased drag coefficient by 0.0009—indicating that air was leaking through ⅛-in. cracks at these points. Short-length fairing (adopted for production craft) increased drag coefficient 0.0012 over that measured for completely sealed fairing. This drag results from both air leakage and airflow disturbance by exposed parts. Data show importance not only of installing fairing over wheel but also of completely sealing wheel well opening.



'copter photo of warehouse fire, Portland, April 9, 1947.
Courtesy *Oregon Journal*

This press car gets there first

To the helicopter fire lines are no problem, nor crowds, nor tough terrain. The reporter gets the news faster. The photographer shoots a pictorial record that's at home on the front page.

Portland's wide-awake **Oregon Journal** has owned a Bell Helicopter since last spring—"primarily to enable the news rooms to cover the news with more speed and accuracy." For the **Gannett** papers in the East, as for the **Journal**, Bell Helicopters are handling spot news breaks.

Still other Bell Helicopters are making news for the **Los Angeles Herald and Express** and for the **New York Journal-American.** They have visited ships at sea . . . welcomed foreign dignitaries . . . followed parades . . . even delivered a beauty queen to the judges' stand. Says publisher William Randolph Hearst, Jr.: "Because of its flying technique you can't beat it on short-range news and photo jobs."

You can't beat it at other jobs, either: from coast to coast and overseas, Bell Helicopters are saving time and earning money for their owners. They're dusting crops, spraying orchards. They're speeding mail and merchandise, hunting oil, prospecting for hidden ore deposits.

The Bell Helicopter **can do** . . . at a remarkably low operational cost. For all the facts about The Modern Magic Carpet*, write Helicopter Division, Bell Aircraft Corporation, P. O. Box 1, Buffalo 5, New York.

BELL HELICOPTER

PRODUCT OF BELL *Aircraft* CORPORATION

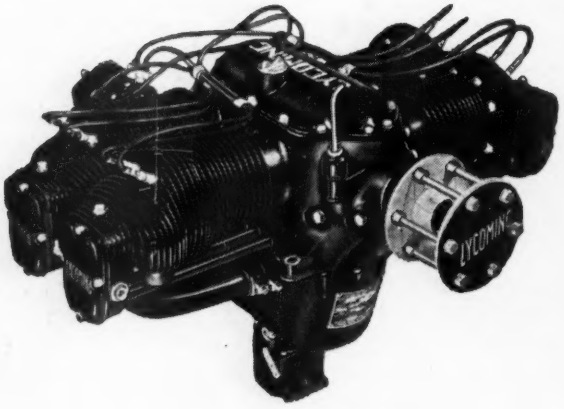
PIONEERS IN JET-PROPULSION, RADIO-CONTROLLED FLIGHT AND SUPERSONIC AIRCRAFT FOR THE U. S. ARMY AND NAVY. DESIGNERS AND BUILDERS OF THE WORLD'S FIRST COMMERCIALLY LICENSED HELICOPTERS FOR LAND AND WATER.

*T. M. REG. U. S. PA. OFF. AND PRINCIPAL FOREIGN COUNTRIES ©1947 B.A.C.

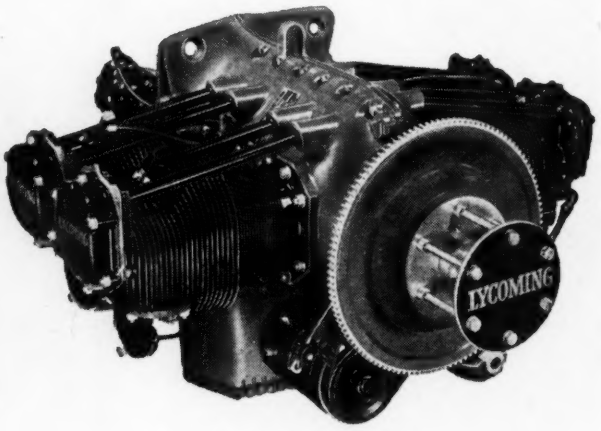
TOPFLIGHT PERFORMERS

—OF THE LIGHT PLANE FIELD!

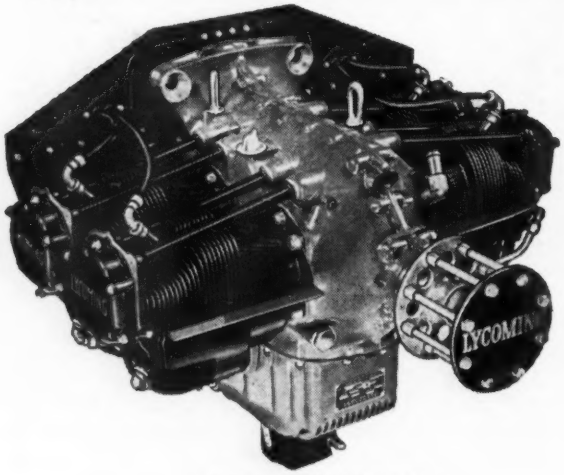
Every airplane needs a dependable engine. Every private plane needs a Lycoming. Thirty-seven years of research development and improvement behind each Lycoming engine makes dependability a certainty.



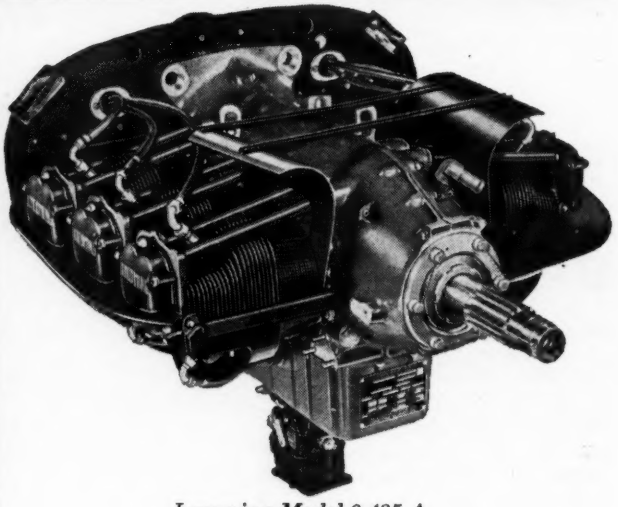
Lycoming Model 0-155
Normal Rated 65 BHP



Lycoming Model 0-235-C
Normal Rated 100 BHP



Lycoming Model 0-290-A
Normal rated 125 BHP



Lycoming Model 0-435-A
Normal Rated 190 BHP

LYCOMING

AIRCRAFT ENGINES

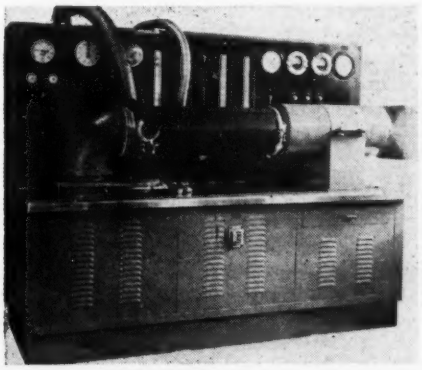
AN AVCO PRODUCT

LYCOMING DIVISION — AVCO MANUFACTURING CORPORATION, DEPT. BB-10, WILLIAMSPORT, PA.

NEW AVIATION PRODUCTS

Machine Tests Aircraft Heaters

Unit to test heaters used in modern aircraft is in production at **Greer Hydraulics, Inc.**, 454 18th St., Brooklyn 15, N. Y., and first one has been delivered to American Airlines. Designated Model JH-1, machine employs two temperature gages, four manometers, a fuel-flow meter, two fuel pressure gages, two air gages, and voltmeter and ammeter. It has adapters so that various model heaters may be mounted for checkup. High-speed blower simulates flight airflow conditions during test, and pressure-feed fuel system and ignition setup duplicate those used on aircraft. Equipment is explosion and fireproof. Accompanying illustration shows Janitrol heater, as used on DC-6, fitted on unit for test.



Speeds Shading of Tracings

Doubletone tracing vellum, developed to enable quick application of two different shadings on the numerous tracings required in wartime aviation industry, is now on commercial market. Special colorless chemical brings up tones from sheet. Maker, **Craftint Mfg. Co.**, E. 152nd St. at Collamer Ave., Cleveland 10, offers this vellum in two types —"Regular" for tracings to be reproduced by contact printing, blueprint, Ozalid, or similar methods; and "O. S." for reproduction by offset, rotogravure, or letterpress.

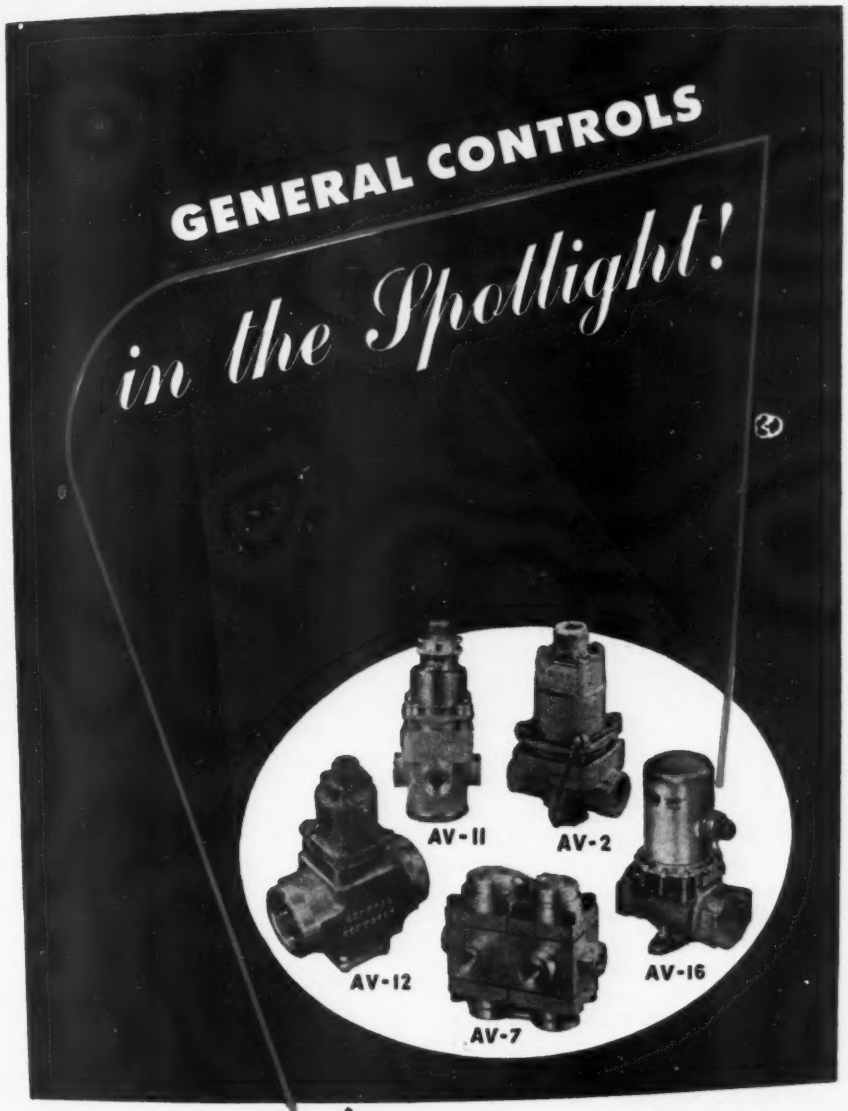
Information Tips

Movie About Transparent Plastic

"Looking Ahead Through Plexiglas" is 16-mm. educational film which advertising department of **Rohm & Haas Co.**, Washington Square, Philadelphia, Pa., has made available on free-loan basis to manufacturers, engineering and design groups, schools, and clubs. Running 30 min., motion picture depicts highlights in development of the transparent plastic from basic raw materials to finished product and its employment in aviation and other fields. Special scenes show rigid performance tests to which Plexiglas is subjected.

Meteorological Equipment Described

Wind velocity and wind direction instruments made by **W. & L. E. Gurley, Troy, N. Y.**, are pictured and described in new 20-page Bulletin 6000 issued by company. Meteorological units covered are electronic and d.c. anemometers; high capacity, moderate capacity, and d.c. type wind direction instruments; the graphic recorder; and pilot balloon theodolite. Included are specifications for transmitters, receivers, calibrators, and indicators.



Unsurpassed *hi-g valves for aircraft**

*Trademark—"hi-g"—indicates positive operation in any position, regardless of vibration, change of motion, or acceleration. Automatic pressure, temperature and flow controls for every aircraft application. *Compact Size · Light Weight · Tight Shut-off* *High Flows with Low Pressure Drop · Long Life.* Outstanding performance and reliability merits recognition and acceptance. Specify General Controls with confidence. For complete specifications, request new Catalog 52C from nearest Factory Branch, or write direct to Factory.

hi-g
GENERAL CONTROLS
501 ALLEN AVENUE, GLENDALE 1, CALIF.
Manufacturers of Automatic Pressure, Temperature & Flow Controls
FACTORY BRANCHES: PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS
KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH
HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

Two Eastern Aircraft Operators Get Goodyear Amphibians On Loan

Atlantic Aviation and Northeast Aviation selected to receive first of 10 planes placed for unique service test to determine market potential.

By ALEXANDER McSURELY

First two of 10 Goodyear three-place amphibians which are to be loaned to aircraft operators are being placed with Atlantic Aviation Corp., Teterboro, N. J. and Northeast Aviation Co., Portland, Me., while the other eight planes in the unique service test program will be loaned to other operators in the Middlewest, South and West Coast areas.

Meanwhile, Goodyear Aircraft Corp., Akron, Ohio, will operate five additional GA-2 planes to compile additional service performance data. Final tabulations of the service test reports, plus additional production cost studies probably will determine whether Goodyear will enter a refined version of the amphibian in the personal plane market when the market begins it eventual expected comeback, or shelve the plane permanently.

Nine of the planes were well on the way to completion, and the remainder were following along on the assembly line when the writer visited the plant last week so that the limited present production program for the GA-2 is already nearing completion.

Indications are that these are all the GA-2s that will ever be made. But if reaction of operators and passengers correspond to the favorable reception the plane has had thus far, and if surveys indicate a reasonable market at the price which the plane must require, Goodyear eventually may produce for sale a modified version of the GA-2. It could be a four-placer, depending on how Goodyear engineers can solve the problem of retracting the plane's main wheels. Now they tuck up into wells high on the sides of the fuselage, so that the wells restrict the width of the rear seat to one passenger. Another possibility under consideration is to use an extension shaft from the propeller mounted atop the wing, ahead of the trailing edge, down to the engine, located in the fuselage. But Ed Burn, Goodyear engineer in charge of the "Duck" development, likes the safety factor of the propeller's present position, so that it will probably remain where it is, out of the way of even the more careless pilots and passengers regardless of the type of engine installation.

Principle criticism, and there is only one, is that the plane is too noisy, an inherent fault of pushers, and needs attention to sound reduction. The amphibian's design goes back to J. Byron Jones, former Goodyear engineer, who developed the original GA-1 and previously had shared in the design of the experimental Applegate amphibian which was once a Piper project. Burn, former director of engineering for Aeronca, took over the Duck project when Jones left Goodyear, and has refined the original plane considerably, and increased the power, although the GA-2 still retains the basic dimensions and design features of the GA-1. (Wing spread 36 ft.; length 26 ft.; height 9 ft. 4 in.; all-metal construction except fabric wing cover.)

Of unusually sturdy construction compared to most contemporary light planes of its size and power class (145 hp.) the GA-2 weighs 1,450 lbs. empty. Has a gross weight of 2,200 lbs., and the wing loading is comparatively high for a light plane, 12.3 lbs./sq. ft. The plane is reported stressed for use of engines as high as 185 hp. It seems indicated that if Goodyear elects to produce a similar plane, in quantity, it will be lightened considerably, and the rather orthodox construction design of both hull and wing will be simplified to take advantage of new production design shortcuts.

However, the airplane is now outstanding in performance for a small amphibian. It cruises at a respectable 110 mph. at 60 percent power, has a top speed of 125 mph. and a 600 ft. (min.) rate of climb. Range fully loaded is reported 300 miles, and it lands around 55 mph. Goodyear does not want to sacrifice this for production shortcuts.

Up to date, Goodyear pilots have put approximately 500 flight hours on the GA-2s, with the bulk of the flying being done by Chapman. As a result of his flight

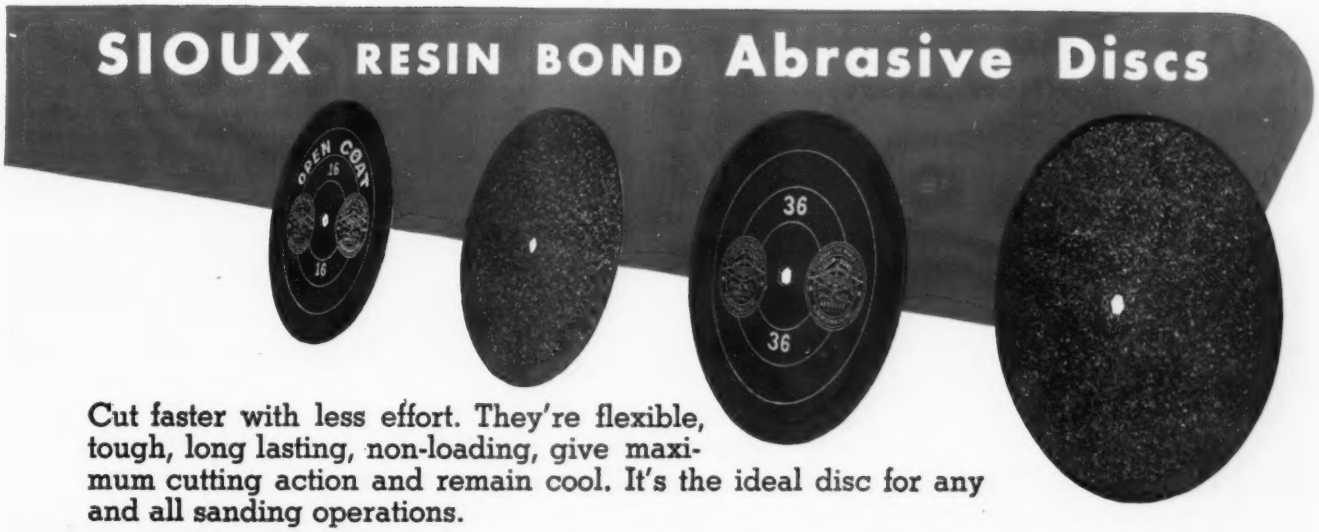
A-26s GO CIVILIAN

Interior of five-place cabin installed in former bomb bay area of Douglas A-26 attack craft—one of five such planes in conversion program at Lockheed Aircraft Service's Burbank base. With cruising speed exceeding 300 mph. and range of 2,500 mi., luxurious business model will be fastest executive-type plane. Seen is aft divan and interphone junction box. Included are sound-proofing, controlled heating and ventilating, lavatory, wardrobe, and table. Three craft have been completed and fourth is in process for Superior Oil Co. Fifth is being converted for Stanolind Oil & Gas Co.

UNBEATABLE

on the TOUGHEST SANDING JOBS — this SMOOTH Combination

SIOUX RESIN BOND Abrasive Discs



Cut faster with less effort. They're flexible, tough, long lasting, non-loading, give maximum cutting action and remain cool. It's the ideal disc for any and all sanding operations.

SIOUX High Speed Sanders

Ball-bearing construction, heat treated alloy steel gears, permanent lubrication. Cyclone fan for increased ventilation and patented tool spindle lock for changing discs. 3 Models: No. 1250—9" High Speed Heavy Duty; No. 1267—7" High Speed Heavy Duty and No. 1265—7" Special.

No. 1267 SIOUX Heavy Duty Sander (illustrated) No load speed 4250 R.P.M. Universal motor operates on A.C. or D.C. Overall length 15"—weight 13½ lbs. A very popular model.

Sold only through authorized SIOUX distributors

STANDARD THE WORLD OVER

ALBERTSON & CO., INC. SIOUX CITY, IOWA, U. S. A.

STANDARD OIL COMPANY
(NEW JERSEY)
Equips New DC-3 with IRVIN Chair Chutes

● To make flying safer for company executives, other passengers and crew members, Standard Oil Company (New Jersey) has equipped its new Douglas DC-3 with Irvin Custom-Built *Chair* Chutes. Earlier in the year, the company equipped its Beechcraft and Lockheed aircraft with these same Air Chutes. The Standard Oil Company (New Jersey) and many other prominent plane owners know that Air Chutes serve the same purpose on aircraft as lifebelts on an ocean liner. These plane owners are doing the obvious, sensible thing by equipping their planes with Custom-Built *Chair* Chutes.

Interior of the new Douglas DC-3 owned by Standard Oil Company (New Jersey) showing the Irvin Custom-Built *Chair* Chute installation. A chute is fitted into the back of each seat... combines beauty, convenience and comfort... is not worn normally but is instantly available in an emergency. Write to Irving Air Chute for complete details.

FEEL SAFER . . . BE SAFER . . .
with Irvin Custom-Built Chair Chutes

There are now over 35,000 registered members of the Caterpillar Club. Should you qualify, please write us.

IRVIN Air Chute
The Life Preserver of the Air

IRVING AIR CHUTE CO., INC.
1671 JEFFERSON AVENUE, BUFFALO 8, NEW YORK

Pacific Coast Branch: 1500 Flower St., Glendale 1, Calif.

experience Chapman has prepared a series of report forms which the operators who receive the planes on loan are asked to use, in reporting to Goodyear on how the plane has been used and how it performs. The operators agree that at least half of the flying done with the amphibian is to be water flying. The reports include two daily sheets, one a pre-flight inspection, considerably more thorough than many of the more careless operators give their planes customarily, including engine inspection, cockpit check, airframe inspection, and engine runup report, with space for remarks on any unusual conditions. The other daily sheet calls for a description of the flights made, passengers carried, landings made on land or water, flight time, and fuel and oil consumption and cost. Each week the operator tabulates the daily reports on a weekly operational costs sheet, which shows flight time, fuel and oil consumption and cost, maintenance, repair, materials, storage and land and water landings, with a space for comments.

With 10 airplanes operating in widely scattered areas of the country, by independent operators who are not connected with Goodyear's test pilot staff, Chapman is confident that the planes will get a much more typical service usage, comparable to that which they would receive if they were being sold to all comers. The reports will be tabulated at Akron, and any repetition of trouble in any part of the airplane, indicated by reports, will be watched carefully for possibility of redesigning the airplane to remedy it. The end result, Chapman believes, will be an airplane which will be unusually trouble-free.

Examination of the GA-2 reveals a number of interesting design features. The instrument panel has a wide flat top surface, almost like a narrow desk, where the pilot would put his maps or papers. The plane has a wide door on the right side, and is easy to enter, with a single step between the ground and door. Seating width and leg room are adequate in the front seats, and single back seat. Landing gear retracts electrically, and wheel wells are placed high above the water line so that problems of sealing the wells against water entrance are limited only to possibility of spray entering. The GA-2 is the only plane its size we know which retracts its tailwheel as well as its main gear. Colored plastic in the overhead windows lessens the danger of sunstroke, and the plane like most pushers has excellent visibility. This is an especial advantage in demonstrating Goodyear's new pet light plane accessory, still not on the market, the castering wheel for crosswind landings. It looks even stranger from the cockpit, to see the wheel tilt at crazy angles, than it does from the ground. Wingslots give the GA-2 good aileron control in stall condition. The hull is an NACA design which gives the plane excellent water handling characteristics, which were emphasized by Chapman's skillful handling.

BRIEFING FOR DEALERS AND DISTRIBUTORS

BONANZA AUXILIARY TANK—A third more fuel capacity for the four-place Beech Bonanza is provided by a new 20 gal. auxiliary fuel tank which the company is prepared to install as optional equipment in the luggage compartment. Bud Hulsman, Goodyear Aviation Products salesman, has the first one in the company-owned Bonanza which he flies. For the salesman-pilot who seldom carries a full complement of four persons in the plane, the installation gives the plane approximately 1½ hrs. more range so that he can make a lengthy flight, at least partly under instrument conditions, and still have enough reserve fuel for an alternate landing field. The 120 lbs. extra weight of the fuel limits the luggage allowance in the compartment, but the tank itself occupies only a small part of the compartment, so that there is plenty of baggage room, if the weight allowance is not exceeded.

WHEN GI PROGRAM ENDS—Two qualified observers of the present commercial aviation picture say that only the GI flight training program is keeping many aircraft operations going. They are fearful that the slackening of flight training in the witner months may prove disastrous for some, while the end of GI training will close many others, they predict, unless some unexpected upturn intervenes. Hardest hit will be two classes, the operators who are still waiting for business to come to them and who aren't out "beating the bushes" for any possible new business, and the operators who became overextended in inventory back in the heydays of 1946 and have never yet regained a favorable liquid position in assets. On a basis of recent field trip observations the operators who are distributors and dealers for Stinson, Beech, and Cessna, generally speaking, appear to be more aggressive in sales efforts, and as a result, in better position to ride out the slack personal plane market season, than do many of the operators representing other companies, the observers opine.

EXPENSIVE ECONOMIES—Aircraft operators who practice false economy by failing to order necessary spare parts in advance of actual needs and who then have to fly a plane to the nearest distributor to get a part or tie-up the damaged equipment on the ground until the part can be shipped on order are adding to their own operating costs by such methods. The keeping of records on equipment which makes it possible to anticipate part failures and replace them in advance and ordering replacement parts well in advance of actual needs are two sound business practices which every successful surface transportation operator follows as a matter of course. The men who operate airplanes would be more successful if they would do likewise.

FIRESTONE NOSE GEAR—Firestone Aircraft Corp. has an interesting new nosewheel landing gear with a "knee-action" joint which is being flown experimentally on a company-owned Ercoupe at Akron. It is a further step in the Firestone engineering program on landing gears which developed the rubber spring superflex landing gears, and a steerable tailwheel. These and several other Firestone-developed projects are expected to be licensed soon to other manufacturers if negotiations now in progress are completed. As indicated in a recent announcement, Firestone is suspending most of its own manufacturing of light aircraft equipment and presumably the new Firestone crosswind gear for tricycle planes, a variation of the superflex gear, also will be eligible for licensing.

GOODYEAR COST STUDY—Most successful of the crosswind gear projects, the Goodyear crosswind wheel, although it has been certificated for manufacture by CAA, is still not assured of production. A cost study and more engineering efforts to bring production cost down are the next steps for the castering wheel. A small quantity of crosswind wheels are being prepared for distribution to various lightplane manufacturers who have shown interest in using the gears experimentally on their planes. Results of these experimental installations and manufacturers demands probably will be a large factor in the final decision. Meanwhile Goodyear is moving ahead on two other adaptations of the crosswind wheel to other types of planes besides the original Piper Cub installation, and the GA-2 amphibian installation. One of these will be on a tricycle-gear plane and the other on a DC-3 transport.

CUSTOMER QUESTIONNAIRE—In addition to the forms which Art Chapman, director of the GA-2 service test program is sending out to the operators who will use the amphibians (see lead story sales and service section) Art is asking the operators to get their passengers to fill out a short form, stating their reactions to the GA-2. Questions include: "Do you find that the GA-2 will meet your requirements for: business, sport and pleasure flying? Considering this type of aircraft and the utility it affords, at what price would you purchase one?" And a third question directed at fixed base operators who may be among the passengers: "Approximately how many units of this type aircraft do you feel you could sell at the price noted, in your territory, per year?" Additional space is provided for suggestions and criticism.

—ALEXANDER McSURELY

The Approved All-Purpose Distress Signal

A-P DAYNITE DISTRESS SIGNAL

T. M. Reg. • Patents Applied For

1,500,000 NOW BEING MADE FOR ARMED FORCES

★ STANDARD — U. S. Navy and U. S. Naval Air Force.
★ STANDARD — U. S. Marine Corps.
★ APPROVED by the U. S. Coast Guard for ships, lifeboats and life rafts.
★ APPROVED by the Civil Aeronautics Administration as replacement for Very pistol and cartridges.
★ SPECIFIED by Air Transport Association for all inflatable life rafts
★ OBSERVED from aircraft in Official U. S. Coast Guard test — 33 miles.
★ OBSOLETES pistol-projected, floating and roman-candle type signals.

Hand held. Safe. Dependable. *Each signal absolutely watertight. Light—less than 7 oz. Compact—5½ long.* 20-second brilliant night flare plus 20-second bright orange day smoke in opposite ends of steel container. Can be seen day or night when overcast would obscure pistol or roman-candle type signals. *Available at all marine and aviation supply dealers. Accept no substitutes.*

AERIAL PRODUCTS, INC., MERRICK, L. I., N. Y.

ARENS *Flexible*

REMOTE CONTROLS

● If remote controls are a part of your present product or included in the design of your new product you can be assured of better performance with Arens Flexible or Rigid Remote Controls. Arens Controls are the result of 25 years experience in building controls to perform vital functions at maximum efficiency even under the most adverse operating conditions.

Arens also manufactures a complete line of control accessories including heads, end fittings, mounting clamps and the Arens Dura-Grom.

ARENS CONTROLS, INC.
2250 S. Halsted Street, Chicago 8, Illinois

Write Today On Business Letterhead For Arens Catalog

Emergency Airport Inaugurates Program

Contract has been awarded for the first of three emergency airports sponsored by the Washington State Aeronautics Commission in cooperation with CAA.

Bandera Emergency Airport, located approximately 15 miles east of North Bend, Wash. in the vicinity of Snoqualmie Pass, will consist of a turf strip landing area 2400 × 300 ft. with an additional 300 × 70 ft. plane parking area. Boundary markers, wind cone, tetrahedron, circle marker, and register stand with first aid equipment and fire extinguisher are to be installed at field. Contractors M. P. & W. J. Halleran estimate the work will cost $67,799.56.

Limited gas and oil supplies will be available at an adjacent garage. Telephone for emergency calls will also be provided.

Kay Appointed Charts Assistant to Wright

Appointment of John D. Kay of the Coast and Geodetic Survey to the position of assistant to the administrator for Aeronautical Charts was announced today by T. P. Wright, Civil Aeronautics Administrator. Kay was assistant chief of the Survey's aeronautical chart branch.

Wright also announced appointment of William Gardiner Fuller and Marlboro K. Downes as chiefs of the airports management and program performance divisions, respectively, of the office of airports.

Post $1,500 Prizes For New Glider Records

Prizes of $1,500 for a new glider distance record—over 340 miles—and $500 for a new altitude record—over 20,500 ft. —have been posted by the Elmira Area Soaring Corp., Elmira, N. Y.

Takeoffs for both flights must be made within 15 miles of the center of Elmira, N. Y., and flights are to be made under rules and regulations set by the corporation and approved by the Soaring Society of America.

Two Sales, One Photo Get State Charters

Senix Aerial, Inc., Eastchester, N. Y., has been chartered with $10,000 capital in $100 shares, to engage in aerial photography. Directors and subscribers are Don and Ellis W. Pruess of Mt. Vernon, N. Y., and David W. Pruess, Hartsdale, N. Y.

Andrews Flying Service, Inc., Georgetown, S. C., has been chartered to deal in airplanes with $25,000 authorized capital stock. D. D. Overton, Jr., is president.

Lakeview Speedway, Inc., Lexington, N. C., has been chartered to deal in airplanes with authorized capital stock of $50,000.

Dependable

CHAMPION

AMERICA'S FAVORITE SPARK PLUG

RC 35 S
Actual Size
Shielded Type

C26—
Unshielded
Actual Size 2⅜"

The dependability that has made Champion America's favorite spark plug is constantly being dramatically demonstrated in record-breaking events on land, water and in the air. Outstanding is the recent world's record, non-stop, non-refueled flight of the Navy Airship XM-1. Champion-equipped engines kept her in sustained flight for over 170 hours, a record for any type of aircraft. Such unqualified dependability is inherent in every Champion Spark Plug for aircraft engines. Champion Spark Plug Company, Toledo 1, Ohio.

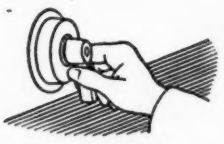
Listen to CHAMPION ROLL CALL, Harry Wismer's fast sportscast every Friday night, over ABC network

INSTALL CHAMPIONS AND FLY WITH CONFIDENCE

No need for a "prop"!

There's no more need to "prop" a plane than to crank a car—now that Delco-Remy electrical equipment is available on popular makes of light planes. Electric starting with its ease, speed and safety adds pleasure to flying. The Delco-Remy generator keeps the battery charged and supplies ample current for lights, radio and accessories. Delco-Remy electrical equipment brings to the air all the efficiency and dependability that have made it the leader on land and sea.

DELCO-REMY
Aircraft
ELECTRICAL EQUIPMENT



Electric Starting for Convenience and Safety . . . Ample Current for Lights, Radio, Accessories

DELCO-REMY
DIVISION, GENERAL MOTORS CORPORATION

WHEREVER WHEELS TURN OR PROPELLERS SPIN

Proposed as replacements for painted rooftops, these new beacons are capable of service with three degrees of intensity, and can be seen up to 20 miles away at night.

New Airport Markers Pioneered by Minnesota

A new system of continuously operating airport beacon markings, designed to aid cross country flyers and eliminate the use of town names painted on rooftops, is being pioneered by the Minnesota Department of Aeronautics. Two test beacons are at Flying Cloud Field, near Minneapolis, and Municipal Airport at Marshall, Minn.

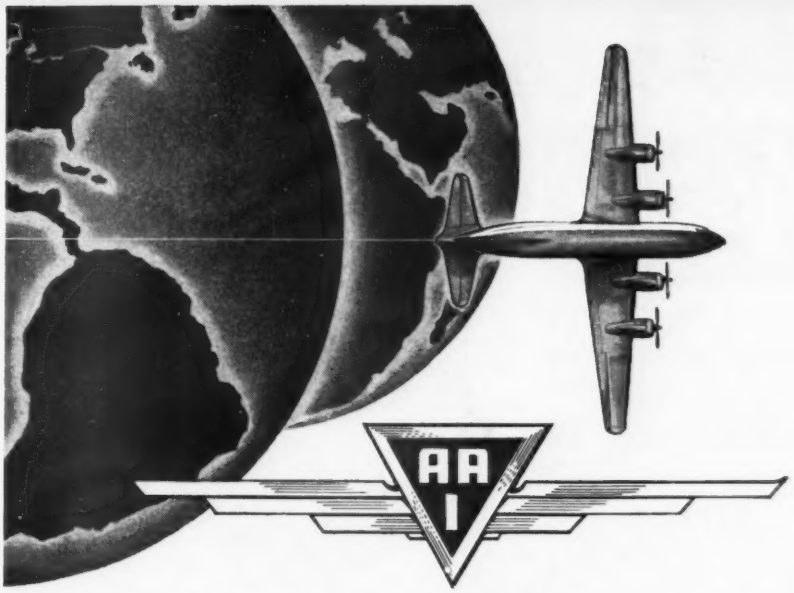
The equipment is manufactured by the Line Material Company of East Stroudsburg, Pennsylvania.

L. L. Schroeder, State Commissioner of Aeronautics, regards the small airport beacons, for which he is seeking CAA approval, as a more satisfactory system of airport markers than the familiar painted rooftop system. Schroeder sees considerable danger in such markings because they invite pilots down to unsafe altitudes in order to read them. Under unfavorable weather conditions, he says, they could cause pilots to fly into obstructions. Schroeder proposes that the state's 90 publicly owned airports all have the new beacons.

With three degrees of intensity, the beacons are constructed like sealed beam lamps, similar to those in automobiles, thus making it a simple matter to repair them. They would revolve 24 hours a day. Those installed on airports equipped for night flying also would have a lamp directed upwards as a ceiling height indicator.

Installed cost per unit would range from $350 to $370, of which the state of Minnesota proposes to pay half. Cost of operation is put at $5 to $8 a year.

On a reasonably clear night, the beacons can be seen from the air for a distance of 15 to 20 miles and about 15 miles in the daytime. When they are located among other lights, the beacons can be picked out from the air eight to ten miles away in sunshine, and 15-20 miles away at night.

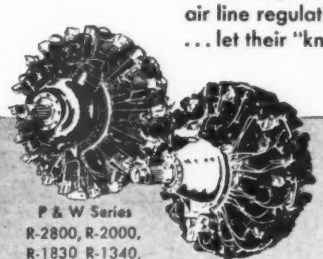


Parts that Fly on

THE WORLD'S MAJOR AIR LINES!

Aviation Activities, Inc., has introduced a new parts service for air lines the world over—a parts service based upon a full stock, ready for *immediate shipment,* of most of your requirements for the maintenance of Wright and Pratt & Whitney aircraft engines . . . at *substantial savings.* Every part shipped under the Aviation Activities emblem is *new* and in *perfect* condition . . . meticulously inspected by *CAA licensed inspectors* . . . treated for long storage . . . properly packaged and correctly labeled by part number and quantity. It's engine parts service at its best!

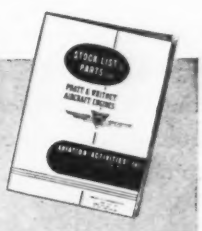
Aviation Activities, Inc., is staffed by men of wide experience in commercial and military aviation—men who know your problems of line maintenance, overhaul, procurement and operation. They know air line regulations and standards the world over . . . let their "know-how" help you!



P & W Series R-2800, R-2000, R-1830 R-1340, R-985

Wright Series R-3350, GR-1820

Write or wire today for "Stock List of Parts," listing available parts. Specify whether for Wright engines, P & W engines, or both.



AVIATION ACTIVITIES, Inc.

Serving the Air Lines of the World

AUTHORIZED AGENT FOR WAR ASSETS ADMINISTRATION

Republic Bank Building
Dallas, Texas, U.S.A.
Cable: AVIACT, Dallas, Texas

Foreign Sales Representative:
AIR ASSOCIATES, INC.
Teterboro, N. J., U.S.A.
Cable: AIRSOC, New York

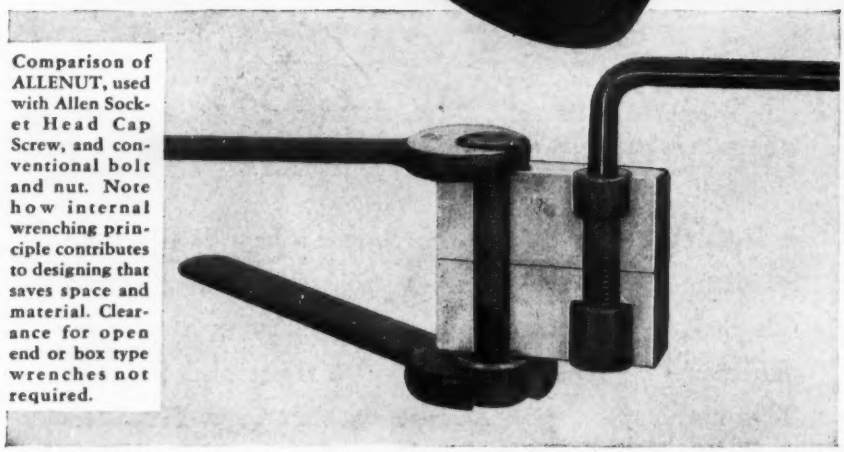
THE ALLEN HEAD ALLENUT

New

internal wrenching

self-locking nut by

ALLEN



Comparison of ALLENUT, used with Allen Socket Head Cap Screw, and conventional bolt and nut. Note how internal wrenching principle contributes to designing that saves space and material. Clearance for open end or box type wrenches not required.

This new internal-wrenching nut HOLDS with a weld-like grip, — *self-locking* in non-hardened metals. Knurled flutes are drawn down into counterbored hole as screw is tightened in the nut. Yet easily removed without damage to nut or containing parts by backing off on screw and tapping screw on head.

Using *ALLENUTS* with Allen Socket Head Cap Screws, the positive *internal* wrenching action of Allen Hex Keys drives fast, firm set-ups in the harder metals. 12-point (double-hex) Allenut socket gives 30° of wrenching swing — as compared with a normal 60° — to speed up assembly in cramped quarters.

The *ALLENUT* sets up *flush* to achieve streamlined surfaces. It facilitates more compact designs with resulting economies in space, weight and material. Adds immensely to the finished appearance of any job . . . Precision-made of special-alloy steel to Allen standards; threads tapped to a Class 3 fit.

Ask your local Industrial Distributor for samples for test applications. Available only through authorized ALLEN Distributors.

THE ALLEN MANUFACTURING COMPANY
HARTFORD, ★ ALLEN ★ CONNECTICUT, U.S.A.

NEW YORK • DETROIT • CHICAGO • LOS ANGELES

Bricker Named Auditor For Southwest Airmotive

Appointment of John C. Bricker as auditor for the Southwest Airmotive Company, Dallas, Texas, has been announced by company officials. Bricker was formerly office manager for Henry C. Beck Co., Dallas.

Bricker

Meanwhile, Southwest Airmotive sales division at Dallas has contracted with B. F. Goodrich Co. to be their distributor in Texas, New Mexico, Oklahoma, Arkansas, Louisiana and Mississippi. Now ready for distribution in SAC warehouses are products representing the complete Goodrich line. In addition, the SAC service division is prepared to install, repair and overhaul all Goodrich items.

County Air Mapping

Snohomish County commissioners at Everett, Wash., voted an emergency appropriation of $10,000 to have the county mapped from the air by Pacific Aerial Surveys, Inc., of Seattle.

It is felt that the use of aerial photographic maps will be of considerable aid to the county assessor and engineer. The assessor will use the photographs to locate logged off land and heretofore unlocated improvements for assessment purposes and the engineer to locate roads.

Neighboring King County made such a survey before the war and collected in taxes more than the initial expenditure by locating many buildings and homes that were not known to have existed. Pacific Aerial Surveys recommends new survey each ten years.

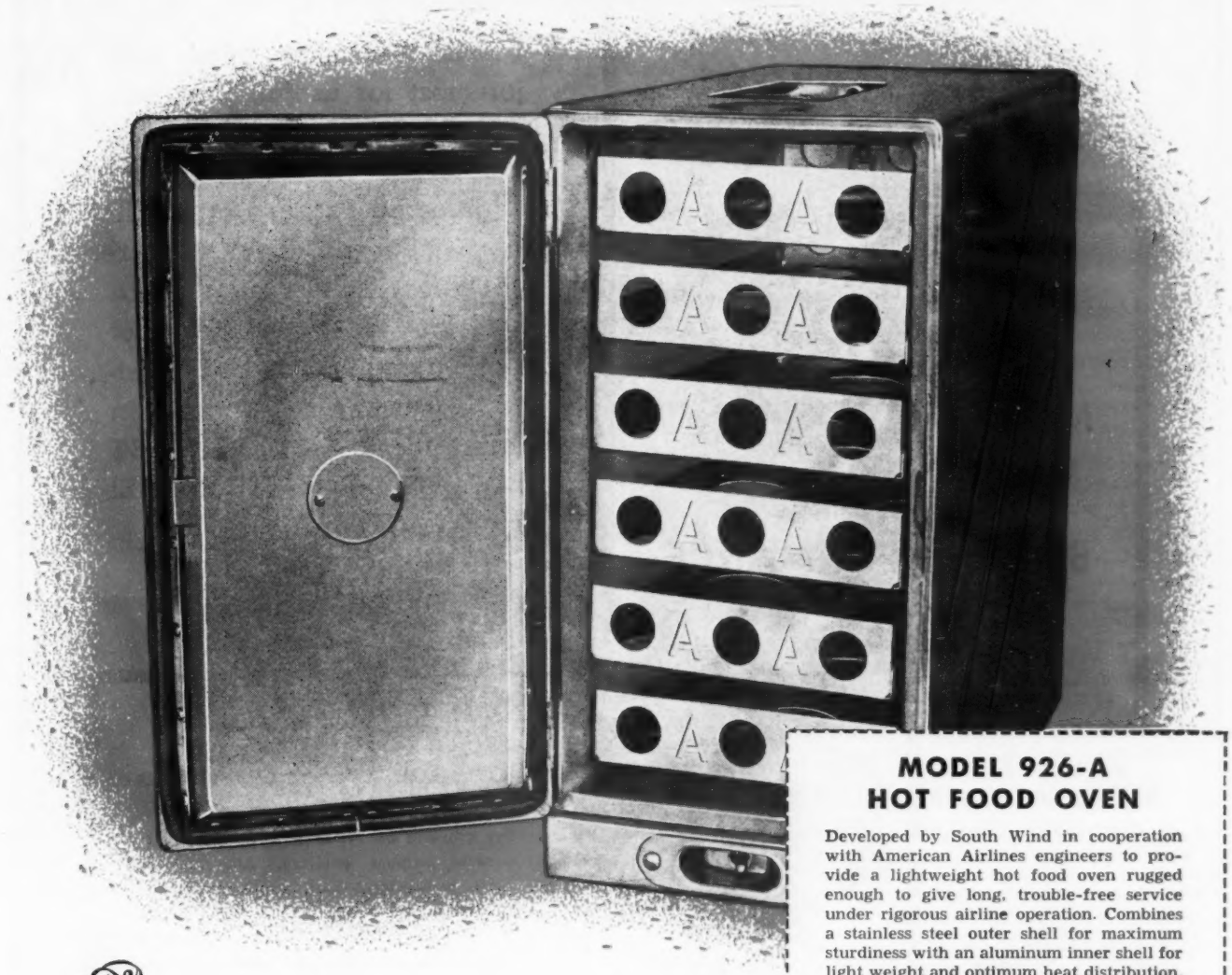
SEA–AIR RESCUE

Ditched Aeronca Chief, sighted through periscope of submerged U. S. Navy submarine Finback, is hoisted ashore at New York, Conn. Pilot was rescued when sub surfaced and picked him up. (International News photo.)

ANOTHER *South Wind* CONTRIBUTION

REG. U. S. PAT. OFF.

TO AIRLINE EFFICIENCY



MODEL 926-A HOT FOOD OVEN

Developed by South Wind in cooperation with American Airlines engineers to provide a lightweight hot food oven rugged enough to give long, trouble-free service under rigorous airline operation. Combines a stainless steel outer shell for maximum sturdiness with an aluminum inner shell for light weight and optimum heat distribution. Unit weighs only 14¼ lbs.; compact—15¾" x 8¼" x 15"; all welded construction; refrigerator-type door with recessed door handle and positive lock; two level heat selection—140°F. and 200°F.; automatic thermostatic control at each level; recessed control switch; fibre glass insulation to retain heat while unit is transferred from commissary to plane.

Do you have an aircraft design or fabrication problem? Perhaps South Wind can help you solve it.

SOUTH WIND'S success in designing and building high quality heating equipment is well known. For instance—South Wind combustion heaters and exhaust gas heat exchangers, of all capacities, are used in most military and commercial aircraft to provide heat for cabin and surface anti-icing.

We have long experience in solving aircraft problems together with modern facilities for quality fabrication, thorough testing and engineering. We welcome the opportunity to be of assistance in the solution of any problems you may have in these fields.

For an interesting conference, without obligation, write to South Wind Division, Stewart-Warner Corporation, New Products Department (A-20), Indianapolis 7, Indiana.

SOUTH WIND DIVISION • STEWART-WARNER CORPORATION

Indianapolis 7, Indiana

UNITED STATES

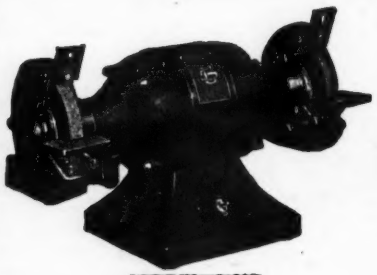
ELECTRICAL TOOLS

BUILT FOR

MEN WHO DEMAND

BEST PERFORMANCE

DESIGNED first, last and foremost for useful, practical, dependable performance in production and maintenance. Engineered so they are well-balanced, perfectly proportioned to reduce fatigue and increase efficiency. Built of basic materials for long-lasting, economical service. In brief, these are **THE BEST ELECTRICAL TOOLS MADE!**



MODEL 6-HD

6" HEAVY DUTY BENCH GRINDER
MODEL 6HD

For grinding all types of edge tools and for general purpose grinding. Also for farms, home workshops, small shops, garages and general industrial use. ⅓ h.p. totally enclosed ballbearing motor. 6" wheels. Coarse and fine grinding wheels enclosed in protecting guards equipped with exhaust outlets.

Equipped with attachment cord, toggle switch, rubber feet and provisions for bolting to bench. Black enamel crackle finish.

MODEL 1M4

¼" CONSTANT DUTY DRILL
MODEL 1M4

Smooth lines, perfect balance, powerful universal motor, 100% anti-friction bearings, helical cut gears, compact design.

THE UNITED STATES ELECTRICAL TOOL CO. OUR 50th YEAR CINCINNATI, OHIO

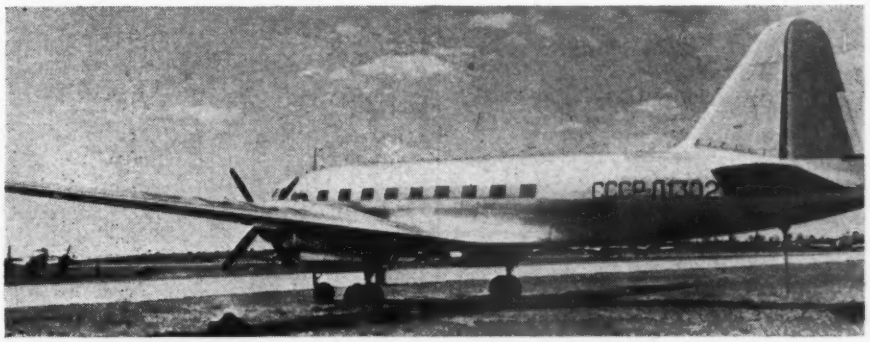
CONTACT YOUR DISTRIBUTOR FOR PRICES AND DETAILS

Drills, grinders, surfacers, polishers, sanders, tappers, saws, hole saws, valve seat grinders, valve refinishing shops, flexible shaft machines and other electrical tools.

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO

Moscow Report Lifts Curtain On Soviet Civil Aviation Growth

Civil airways, expanded five-fold in past 15 years, now total 93,00 miles; 1947 passenger and freight traffic expected to reach five times prewar figure.



Latest photos show interior and exterior of Soviet IL-12.

Sovfoto

BY ANDREW STEIGER

MOSCOW—Soviet air strength is coming of age. Now operating 93,000 miles of internal civil airways, the Soviet Union ranks among the world's two greatest air powers in civil air service, as well as military air might.

"Soviet air transport holds first place in the world for the length of air lines and the quantity of air freight carried, and second place for passenger traffic," it was recently stated by Air Marshal F. Astakhov, chief of the Soviet Civil Air Fleet Administration. He added that "Passenger traffic by 1950 should be 14 times greater than it was in 1940." He did not say what the 1940 figure was.

During the past fifteen years, Soviet civil airways have expanded nearly five times over, and are being extended. This year alone, about 7,500 miles of lines opened.

▶ **Exceeds Other Transport**—The mileage of Soviet airways is greater than that of any other form of internal transport in the Soviet Union, whether rail, road or waterway.

One main trunk airline extends from Moscow across Siberia to the Pacific, with stops at the main junctions of the Trans-Siberian railway. Another reaches across the Southern Urals from Moscow to Tashkent and Alma Ata. Trunklines reach from Moscow north to Leningrad, west to the capitals of the Baltic States, to Minsk and Kiev, and south to the Caucasus. A new airway is being opened to link Tbilisi with Odessa via the Black Sea ports Batumi, Sochi and Sevastopol.

Moscow, the heart of the Soviet civil airways system, is connected by air with the capitals of the 16 republics in the USSR. Planes taking off from Moscow reach the capitals of fourteen of these republics on the same day.

▶ **Expensive Trip**—The most expensive air trip one can take from Moscow is the flight to Anadyr on the Bering Strait opposite Alaska. The passenger ticket costs 3,880 rubles, the equivalent of five months' pay to the average citizen. For internal lines the luggage limitation is 55 lb. per passenger; 11 lb. free carriage. For international lines, the baggage limitation is 132 lb.; 33 lb. free.

Air passenger and freight traffic of Soviet airways this year is expected to reach a total five times greater than prewar level. Total passenger haul in 1947 is expected to top by 400,000 the 1946 mark. During the first nine months of 1946 the Soviet civil airways were reported to have transported 230,000 passengers and about 30,000,000 pounds of air freight.

Flying from Moscow's two main airdromes, regular civil airway planes connect the Soviet capital with about 80 cities, including 15 outside the Soviet Union. In 1946, 30 planes daily were landing and taking off from the capital.

▶ **Moscow's Major Airport**—The civil airport at Vnukovo, 25 miles from Moscow, is the city's major airdrome both for internal and for international airlines.

Operating on a 40-minute express schedule, large comfortable motor busses ply between the Soviet capital and the airport. Every day Vnukovo now services more than 1,500 air travelers, among them many who arrive from and depart to foreign lands. Customs inspection is also carried out here for passengers arriving from abroad. Air-freight is dispatched and received at Vnukovo field.

Russians do not follow the American practice of using safety belts in taking off and landing. Nevertheless, chief of the Civil Air Fleet Astakhov stated recently that "judging by available statistics Soviet air transport ranks first in the world for safety of air travel."

All pilots of the civil air planes are skilled airmen, many with distinguished wartime service and some with phenomenally long civil service records. Among the pilots operating out of Vnukovo are several "million-milers."

▶ **Civil Aircraft**—The majority of the civil air fleet transport and passenger planes at present are Russian-produced DC-3s, but a new plane identified as the "IL-12" which has been developed by S. I. Ilyushin designer of the famous "Stormovik" bomber, seems earmarked to replace these planes on trunk lines. The "IL-12" which seats 27, is reported to develop a speed about 60 miles faster than the Douglas planes.

"AN" AIRCRAFT HARDWARE

...by the Carton...or the Carload

...standard AN BOLTS
NUTS • SCREWS • FITTINGS
Rivets • Pins • Pulleys • Cable
Accessories • Washers • Spacers •
Bearings • Hose • Hose Clamps
• DZUS Fasteners
IN A COMPLETE RANGE OF SIZES

All doubly-inspected to AN specifications. If you don't see it here, ask for it! Your order gets immediate attention, the same day we receive it...whether it's a carton or a carload...via Air, Rail or Motor Truck, as you specify. Special Jet Products or machined parts are a specialty with us.

Send for New Stock List

STOCK LIST

AGENTS FOR WAR ASSETS ADMINISTRATION

Phone
Wire or
Write • • •

Dumont
AVIATION & SUPPLY CO.

1300 East Palmer Avenue, Compton, California

One of the nation's largest suppliers of Standard AN Hardware for the Aviation and Allied Industries

Successful test flights have been made on long distance swings out of Moscow. A larger passenger transport seating 70 persons has been developed by the noted Russian designer A. N. Tupolev. This plane was first shown publicly at the Aviation Day celebration Aug. 4.

The Aviation Day air show also disclosed a series of jet-propelled planes, designed by seven of the Soviet Union's leading aircraft designers—Yakovlev, Lavochkin, Mikoyan, Gurevich, Sukhov, Ilyushin and Tupolev. To judge from current comment in the Soviet press, jet-propulsion is a field with which Russian aeronautical engineers have long been familiar. "The modern airplane is the material expression of the latest achievement in Scientific thought," stated a recent *Pravda* editorial, adding: "Our native land which first gave the world the scientific theory of flight and then the theory of jet-propelled motion has made a great contribution to the rapid progress of aviation. The development of aviation techniques, the application of jet-propelled engines, the increase of speed, distance and altitude of aircraft flights, the utilization of radar—all set new tasks before those who design and build aircraft as well as those who fly in them."

► **Regional Airways**—For all main trunklines the Soviet aircraft industry, which during the war developed an output capacity of 40,000 planes per year, is to supply multi-seat fast transports. Light machines simple to pilot and to service are to be produced for the local airlines. Main trunklines link the major cities in the national network, while local airlines branch out from major centers to reach the small towns.

One of the problems still only partially solved by the civil air authorities is the paving of good roads and the establishment of good normal transport between the airports and the cities they serve. Whereas the city and airport communications in Moscow and other centers are satisfactory, it takes about as much time, for instance, to get from the Leningrad airport to the city by available surface transport as it does to travel by air from Moscow to Leningrad.

► **Multi-Purpose Use**—Apart from transport of passengers and air freight, planes of the Soviet civil air fleet perform an estimated 60 special functions.

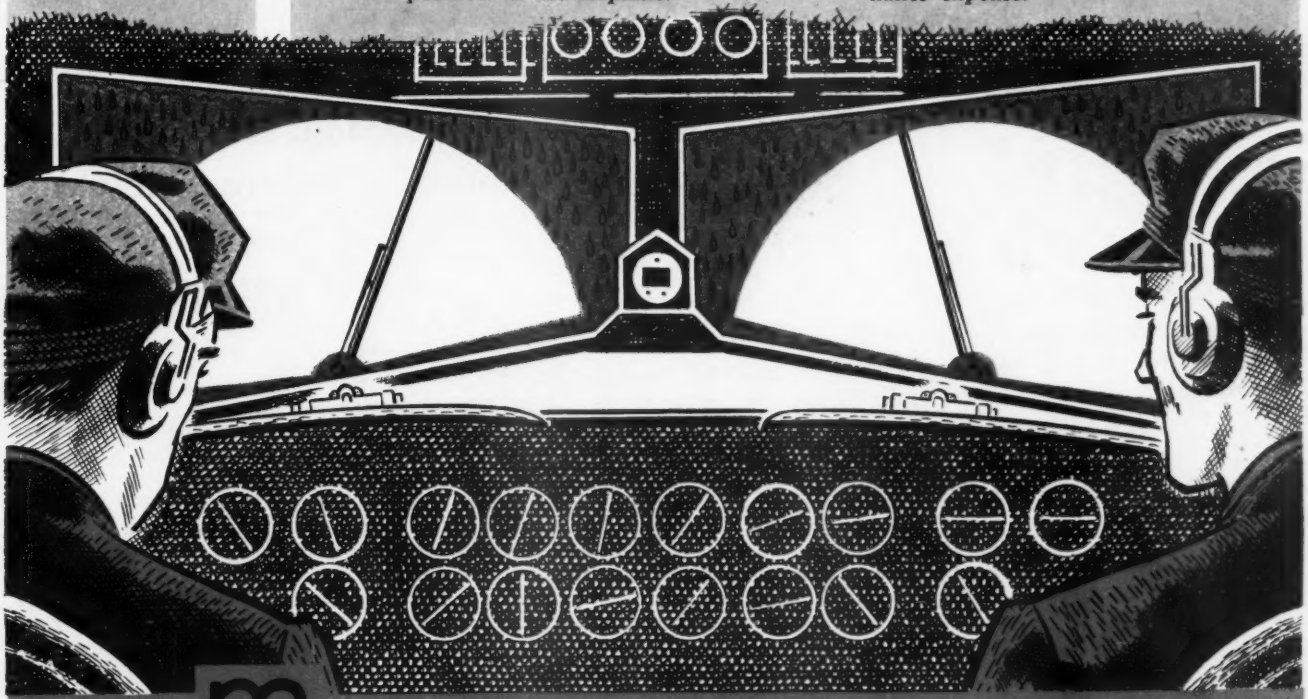
Civil air pilots keep watch over high-tension power transmission lines to facilitate speedy repair work. Ranging the seas, they scout out schools of fish for the fishing fleet. In the Arctic ice patrol they search the pack for lanes, guiding ice-breaker convoys. In rural areas remote from rail and waterway they transport tractors, seed and farm implements, bring in young fish to stock farm ponds and carry incubated chicks to help build up poultry yards in war-devastated farms. For planting in the Ukraine, they transported seed for kok-sagyz rubber plants from Central Asia. In Central Asia civil airmen perform cowboy service driving herds of cattle to pasture.

The NEW Marquette model 3V hydraulic wiper

. . . is the result of 10 years of experience in this highly specialized field. It incorporates every feature that is desirable and practical, based on thousands of installations on military, naval and commercial aircraft.

gives you *all* these advantages

- Blades are synchronized at all times.
- Obstruction in path of blade will not stall it.
- Blades may wipe in same or opposed direction.
- Blades are parked and locked when wiper is not in use.
- Universal drive arm and tie rod require minimum stock of parts.
- Wiper blades are easily replaced.
- Pressure is removed from system when not in operation.
- Motor unit may be located at any position in the airplane.
- Stroke on each window can be varied.
- Hydraulic tubing eliminates linkage control and provides additional space for mounting other instruments.
- Motor unit and window units are universal, providing maximum interchangeability of parts.
- Constant torque values through entire stroke.
- Uniform stroke at all speeds.
- Simplicity of design, resulting in lower first cost and reduced maintenance expense.

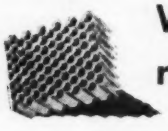


The Marquette METAL PRODUCTS CO.
CLEVELAND 10, OHIO

SUBSIDIARY OF CURTISS-WRIGHT CORPORATION

Manufacturers of: HYDRAULIC AND ELECTRIC WINDSHIELD WIPERS · FUEL OIL PUMPS
HYDRAULIC GOVERNORS FOR DIESEL ENGINES · ROLLER BEARING TEXTILE SPINDLES
AIR COMPRESSORS · PRECISION PARTS AND ASSEMBLIES

STRENGTH travels with LIGHTNESS
in the Boeing 377 Stratocruiser



Weldwood Honeycomb walls add rugged stiffness . . . subtract weight

THOSE new Boeings . . . they're big. Able to carry 81 passengers cross country, or 114 on commuter flights. With loads like that, they can't tolerate any deadhead weight.

Every square inch of material must justify itself in three ways: in lightness, in rugged strength, and in dimensional stability.

Weldwood* and Armorply* Honeycomb boast an amazingly high strength-weight ratio. The multicellular core weighs as little as 4 lbs. per cu. ft. The facing can be beautifully grained matched veneer, gleaming aluminum, stainless steel or plastic. Honeycomb's mechanical properties, rigid strength, and insulating qualities offer the plane designer many advantages.

Honeycomb core can be made of impregnated cloth, paper, Fiberglas, or other material. Armorply and Weldwood Honeycomb are available in stock sheets, contoured panels or semi-finished form to your specifications. Get full engineering data on these spectacular airworthy materials. Write today.

*T.M. U.S.P. Co.

Installing Armorply Honeycomb wall of ladies' dressing room in the Boeing 377 Stratocruiser.

WELDWOOD and ARMORPLY
HONEYCOMB *products of*

UNITED STATES PLYWOOD CORPORATION
55 West 44th Street, New York 18, N.Y.

Manufacturers of Weldwood Flat and Molded Plywood, Armorply, Flexmetl, Industrial Adhesives, Plastic Laminates and parts.

Trains Are Favored

Survey Shows Slight Decline In Enthusiasm For Air Travel

Young people and recent users continue to be biggest boosters of plane transportation, according to study made for Association of American Railroads.

The growing trend in public preference for air travel which continued through the war years has been halted, and railroad transportation has gained slightly in passenger favor, according to results of a recent nationwide survey.

Air transportation is still increasing its appeal to persons under 30, the study disclosed. But the airlines apparently have a major problem in boosting their popularity among older people, lower income groups, residents of rural areas, women and large segments of the population in the South and Middle West.

► **Majority Favors Trains**—Of 2,583 persons interviewed by the Opinion Research Corp. for the Association of American Railroads, 51 percent said they would prefer to travel by train if fares are equal. Forty-four percent expressed preference for air transportation, and 5 percent were undecided. Among the 2,583 respondents, 282 said they had used the airlines recently, and 2,301 said they had not.

In a similar study made last year, 49 percent of those interviewed preferred rail transportation, 46 percent air travel, and 5 percent were undecided. While the airlines lost 2 percentage points between 1946 and 1947, they held most of the impressive gains made between 1943 and 1946. During that period, public preference for rail travel dropped from 61 percent to 49 percent as air transportation increased in favor from 35 percent to 46 percent.

► **Air Travel Enthusiasts**—The research organization emphasized that despite their gain in favor with the public generally the railroads have not improved their standing with the two groups which have consistently been most enthusiastic about air travel—young people and persons who said they had made a commercial flight recently. In 1946, 62 percent of the interviewed persons under 30 years of age preferred air travel to rail transportation, while in 1947 the figure increased to 65 percent. Thirty-one percent of the younger age group now favor rail travel, and four percent expressed no opinion.

Among persons of all ages who had made a recent commercial plane flight, 81 percent favored air travel against 79 percent last year. Only 13 percent of the respondents who had flown recently favored railroad transportation in this year's survey, and 6 percent were undecided. But among those who had not flown recently, 55 percent preferred rail travel against 40 percent for air transportation while 5 percent stated that they were undecided.

► **Income Groups Studied**—While 65 percent of the interviews with persons under 30 years of age showed a preference for air travel over rail transportation, the figure dropped to 45 percent in the 30-44 age group and to 33 percent among people 45 years old and over. Whereas 47 percent of the respondents in the upper and middle income groups favored air travel against 48 percent for rail transportation, only 37 percent in the lower income bracket preferred air travel compared to 57 percent favoring rail transportation.

In cities of 100,000 population or over, 54 percent of those interviewed favored plane travel and 41 percent rail transportation. But in communities with between 25,000 and 100,000 population the percentage favoring air travel dropped to 51 percent. In towns of 2,500 to 25,000 population air preference was only 41 percent and in rural areas, 37 percent.

► **Women Less Favorable**—Of 1,468 men interviewed, 47 percent favored air travel if fares were equal and 47 percent rail transportation, with 6 percent undecided. Only 40 percent of the 1,115 women interviewed expressed preference for air transportation, against 56 percent for rail travel and 4 percent undecided.

Residents of the far West appear to be most enthusiastic about air transportation. Fifty-four percent of the persons in this area favor planes, 40 percent prefer rail travel, and 6 percent are undecided. In the East, 46 percent prefer plane travel (48 percent rail); Middle West, 44 percent plane (51 percent rail); and in the South, 30 percent plane (66 percent rail).

► **Safety Factor**—The public regards rail transportation as preferable to air travel in three major respects, according to the survey. These are safety, spaciousness of accommodations and dependability. Speed was given as the airlines' outstanding advantage, although the public also believes the air carriers offer a higher quality personal service than the railroads.

Asked which is the safest way to travel, by plane or train, 60 percent of the 2,583

FARMER'S SHOPPING TRIP

An Alaskan farmer who recently made extensive purchases of livestock and equipment in Seattle had his new possessions loaded aboard an Alaskan Airlines C-47 which he rode back to Anchorage. Included in the cargo were cows, calves, pigs, a tractor and other farm gear. Frequent strikes by longshoremen and seamen boomed airfreight business to Alaska last year, and new walkouts again are crippling surface transportation.

respondents favored the railroads against 13 percent for the airlines. Twenty percent said the two modes of transportation have about the same degree of safety, while about 7 percent were uncertain.

► **Groups Studied**—Among the 282 persons who had used the airlines recently, 33 percent felt trains are safer, 27 percent favored planes, 29 percent believed chances of mishap are about the same, and 11 percent were uncertain. In contrast, 63 percent of the 2,301 persons who had not used air transportation recently believe trains are safer, 11 percent favor planes, 19 percent said they are about the same, and 7 percent were uncertain.

Fifteen percent of the men believe the airlines are safer, 59 percent favor the railroads on this count, and 19 percent think both have about the same degree of safety. Only 9 percent of the women interviewed believe the airlines are safer, 61 percent said the railroads are safer, and 21 percent think they are about the same.

► **Opinion By Ages**—In the upper income group, 16 percent believe the airlines are safer than the railroads, but only 10 percent of the lower income group agree. Nineteen percent of all respondents under 30 years old think planes are safer than trains, against 14 percent in the 30 to 44-year-old group and 9 percent among persons over 44 years old.

Whereas only 9 percent of those interviewed in rural areas said air transportation is safer than rail travel, 16 percent of those living in cities of over 100,000 population took that view. In the South, 6 percent of the respondents think plane travel is safer than rail, in the East 12 percent, in the Middle West 15 percent and in the Far West 16 percent.

► **Recent Crashes Not Factor**—Since the survey was conducted in late April and early May, the results were not affected by the three DC-4 crashes which occurred in late May and early June.

Asked what they liked best about plane travel, 40 percent of the 2,583 persons interviewed mentioned speed, 7 percent cited comfort, 4 percent cleanliness, 3 percent better servcie, 2 percent said it was generally more enjoyable, and 1 percent mentioned convenience, scenery or free meals. While some persons cited more than one advantage, 56 percent (many of whom had never traveled by air) could think of no reason for using plane transportation.

► **Fine Points Listed**—When asked what they liked best about rail transportation, 35 percent of the respondents mentioned more space, 27 percent cited safety, 10 percent convenience, 9 percent scenery, 7 percent dependability and 2 percent said it was cheaper or that there is more companionship on trains. Twenty-four percent failed to cite an advantage for rail transportation.

Thirty-nine percent of the public believe trains are more comfortable than planes, the survey indicated, while 35 percent favor air travel on this score, 5 percent have no preference and 21 percent are undecided. Asked which is the most certain to get one to his destination at the expected time, 60 percent said trains, 24 percent airlines, 7 percent had no preference and 9 percent were undecided. Among those that had used the airlines recently, 51 percent believed the railroads are more dependable, 28 percent favored the airlines and 12 percent had no preference.

Airlines have more friendly and courteous employes, according to 36 percent of the persons interviewed; 9 percent said the railroads are better in this respect, 16 percent declared there is no difference and 39 percent were uncertain.

Pullman Plea

The Pullman Company has sought Interstate Commerce Commission authority to raise sleeping car fares up to 49 percent, but if the increase is granted it probably won't switch many passengers to air travel.

Largest increases proposed apply to short trips. No boosts were requested on sleeper tickets that now cost $17.70 or more, and present seat charges for both sleeping and parlor cars would be retained. Revenue from sale of Pullman accommodations and charter of cars declined from a wartime peak of $158,000,000 in 1944 to $127,000,000 in 1946.

Braniff Gets DC-6

Braniff Airways has received the first of six DC-6 sleeper planes to be used on the company's Latin American routes. Carrier hopes to inaugurate international operations this fall.

UAL Eyes Inland's Link to Twin Cities

United Air Lines, which last week was slated to begin operations over the Denver-Los Angeles route recently acquired from Western Air Lines (AVIATION WEEK, Sept. 1), is seeking means to reinstitute the one-carrier through service between Minneapolis-St. Paul and Los Angeles formerly furnished by WAL and its subsidiary, Inland Air Lines.

W. A. Patterson, UAL president, has announced willingness to achieve the through service by either of two methods—purchase of Inland's Twin Cities-Denver route or working out an arrangement with Mid-Continent Airlines to fly over its system from Omaha to Minneapolis-St. Paul.

During the hearing before CAB on UAL's acquisition of Western's Denver-Los Angeles link, Patterson stated his company would purchase the Inland route to the Twin Cities if CAB would set the price and approve the deal. In a recent letter to J. W. Miller, Mid-Continent president, Patterson re-emphasized his interest in negotiating for Omaha-Twin Cities flying rights as an alternative should he not be able to acquire the Inland route.

Tigers' Work Extended

The Flying Tiger Line's contract with the Army Air Transport Command for trans-Pacific operations has been extended to Dec. 1, according to Robert W. Prescott, president. Since commencement of flights on Jan. 15, 1947, the Tigers have recorded nine million plane miles, 124 million passenger miles and 33 million ton miles. The carrier operates ATC C-54s with crews numbering six men which make the daily service trips to Tokyo.

REJECT "LOW CEILING" ON HEMLINES

Putting the taboo on anti-"CAVU" fashion trend, American Airlines stewardesses have vetoed half-calf skirt length and will maintain altitude no lower than two inches below knee —depending on individual height. Claim is shorter uniform looks smarter and is more comfortable. Glance at comparative photos (style back in '30s seen at right) probably shows why passengers aren't squawking.

ELECTROL'S 511 AIRCRAFT BRAKE VALVES *Offer* THESE ADVANTAGES

Typical installation of the 511

1. Valve comes with interchangeable pedal and can be used on either right or left side.
2. Position of pedals allows maximum operating convenience.
3. Standard parts.
4. Large reservoir capacity.
5. Light weight.
6. Long life.
7. Low cost.
8. Easy maintenance.
9. Economical upkeep.
10. Reliable performance.
11. Low pedal loads.

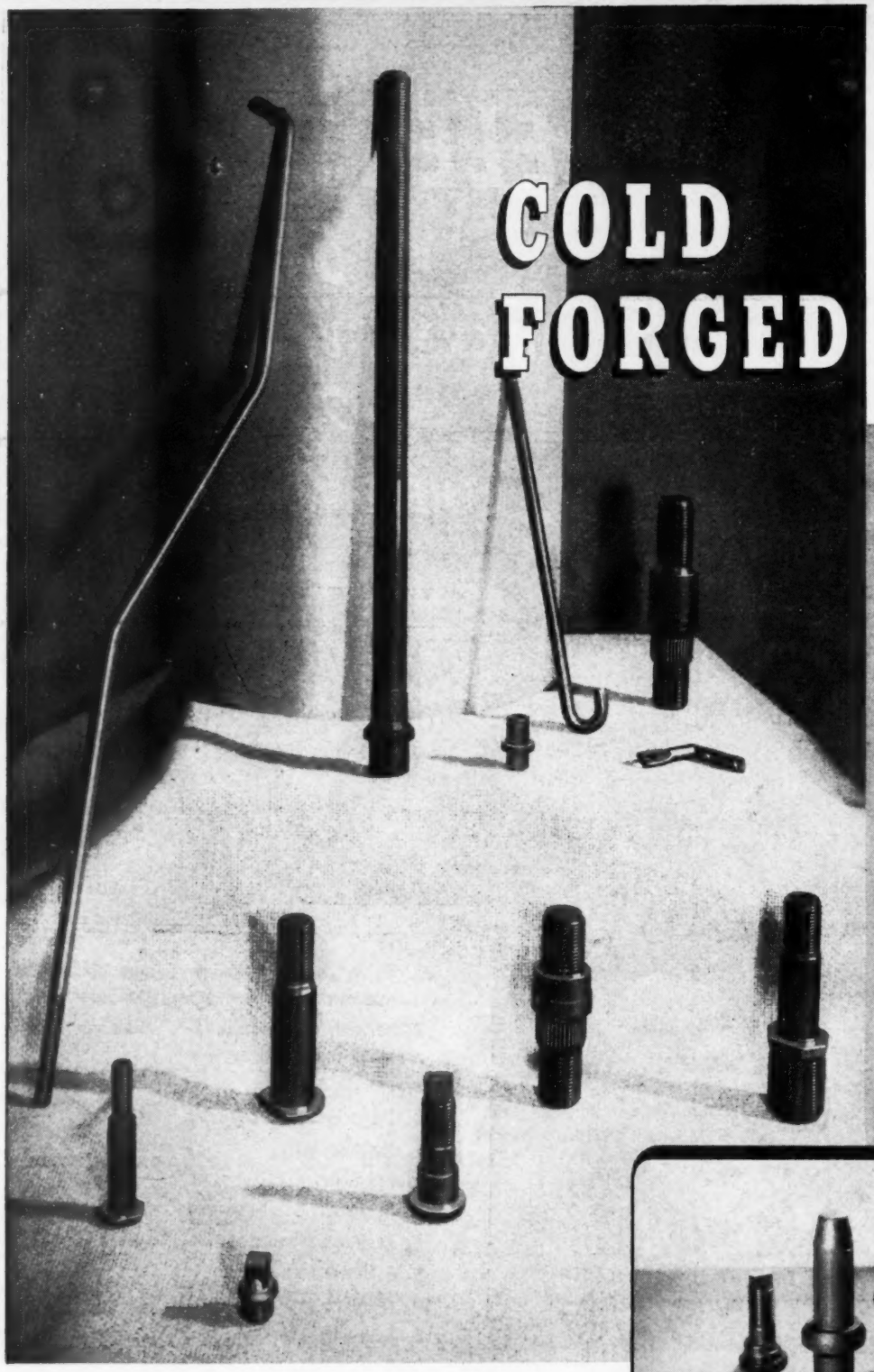
CYLINDERS • SELECTOR VALVES • FOLLOW-UP VALVES • CHECK VALVES RELIEF VALVES • HAND PUMPS • POWERPAKS LANDING GEAR OLEOS SOLENOID VALVES ON-OFF VALVES • SERVO CYLINDERS • TRANSFER VALVES • CUT-OUT VALVES • SPEED CONTROL VALVES

Complete information upon request

ELECTROL INCORPORATED

FOR BETTER HYDRAULIC DEVICES

KINGSTON, NEW YORK



COLD FORGED PARTS

Allied's experience in producing cold forged parts is your guarantee of:

- High volume production at low cost
- Tolerances as close as are required for most machined parts
- Strength and durability
- "On time" delivery

Quotations figured from your part prints will be submitted promptly.

ALLIED CORPORATION PRODUCTS — PRECISION · EXPERIENCE · DEPENDABILITY

ALLIED PRODUCTS CORPORATION
DEPARTMENT 35

4614 LAWTON AVENUE DETROIT 8, MICHIGAN

SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS
SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS
SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

Equipment Interchange Agreement Endorsed

Approval of an agreement by which TWA and Delta Air Lines would interchange equipment at Cincinnati, Ohio, has been recommended to CAB by Examiner Herbert K. Bryan. The proposed operation would provide new one-plane service between Detroit, Toledo and Dayton, served by TWA on AM 58; and Atlanta, Miami and other points in the South and Southeast served by Delta's AM 24 and 54.

Both carriers agreed to lease to the other whatever planes might reasonably be required to complete through schedules. Although the pact provides for leasing of equipment by each party, at the outset it is planned that only Delta's aircraft will be used, with TWA crews taking over Delta planes at Cincinnati for the northward run to Dayton, Toledo and Detroit.

ICAO Council Holding Session In Montreal

Second council session of the International Civil Aviation Organization was slated to open last week in Montreal with the 21-nation group to receive progress reports on ICAO's campaign to cut down the red tape of customs and immigration which hampers international airlines.

The council also will examine the comments of member states on the desirability and practicability of international ownership of all trunk airlines. It will discuss the special problems of nonscheduled international operations.

Other items on the agenda include a study of ICAO's machinery for collection and dissemination of air transport statistics; problems of double taxation, insurance, international airmail rates and standardization of airport charges; and consideration of requests from various nations for financial and technical help in establishing and operating navigation facilities necessary for international air transport.

Pan American to Open New Route to Tokyo

Pan American Airways will inaugurate a new trans-Pacific service on Sept. 25 when it begins weekly flights to Tokyo and other major cities on the Asiatic mainland.

DC-4s equipped with sleeperettes (AVIATION WEEK, July 14) will fly the central Pacific route via Honolulu and Wake Island to Tokyo, then on to Shanghai, Hong Kong, Bangkok and Calcutta, where connections can be made with PAA's Atlantic services. First eastbound flight over the new link is slated to leave Calcutta for Tokyo and San Francisco on Sept. 30. Pan American has been operating a weekly trip to Bangkok and Calcutta via Manila since June.

FAST FUELING

An underwing fueling system which will cut Boeing Stratocruiser gas servicing time by more than 60 percent is being made available for the new double-deck transport and will be used in the planes ordered by American Overseas Airlines and Northwest Airlines. The Stratocruiser can be fueled completely with 7,620 gal. of gas in less than 15 minutes with the underwing installation, Boeing states. An engineer is shown attaching a non-spilling nozzle to a specially-designed fuel cell valve on a test rig. Smaller hoses shown on wing are part of test equipment and lead to manometer board.

California Eastern Elects Barrie Vice President

Election of Allan A. Barrie as vice president in charge of operations has been announced by California Eastern Airways, transcontinental airfreight line based at Oakland, Calif.

A former vice president of Western Air Lines, Barrie joined the cargo carrier a year ago and has served as executive assistant to President J. J. O'Brien and as operations manager. During the war he was assistant chief of staff of the Army Air Transport Command's Ferrying division.

Other personnel developments:

• **Air Express International Agency, Inc.**—William V. McTaggart has joined the staff and will assist in developing the company's foreign and domestic cargo forwarding business. He was formerly with Railway Express Agency's Air Express division, Trans Caribbean Air Cargo Lines and Latin American Airways.

• **American**—Edward Doherty, Jr., formerly with TWA and Capital Airlines (PCA) has been appointed to the carrier's public relations staff in New York. Robert L. Smith has become cargo sales representative in the New York City women's garment district.

• **Northeast**—Charles H. McKenney, formerly with American Airlines, has been named passenger sales manager.

• **Railway Express Agency**—James B. Finnin has become manager of Air Express for REA's eastern departments, succeeding R. G. McLain.

SHORTLINES

► **American**—Is now represented in Central America by TACA through a recent agreement providing for exchange of both passenger and cargo traffic. The pact provides connecting service for American to Central and South American points.

► **American Overseas**—Daily nonstop trans-Atlantic service from New York to Shannon, Eire, was slated to be resumed last week. All AOA flights stopped at Gander, Newfoundland, during the summer months.

► **Braniff**—Carried 50,642 revenue passengers in July, 1,500 more than in June. Revenue passenger miles increased from 16,835,448 in June to 16,958,388 in July. All categories of cargo were up for July, with airfreight showing the largest jump—49 percent over June volume...Company is now making reservations at the Stevens, Palmer House and Sherman hotels for Chicago-bound passengers. Under the plan a passenger requests his hotel space simultaneously with his airline reservation.

► **Capital**—Flew 7,738,742 lb. of airfreight in the twelve months ended July 31—its first year of freight operations. During the first quarter of the period, the carrier flew 908,301 lb. against 2,623,751 lb. in the quarter ended July 31, a 160 percent gain in volume ...Company has announced installation of a new system-wide set-up which permits immediate confirmation of reservations even when return, connecting or stop-over passage is involved.

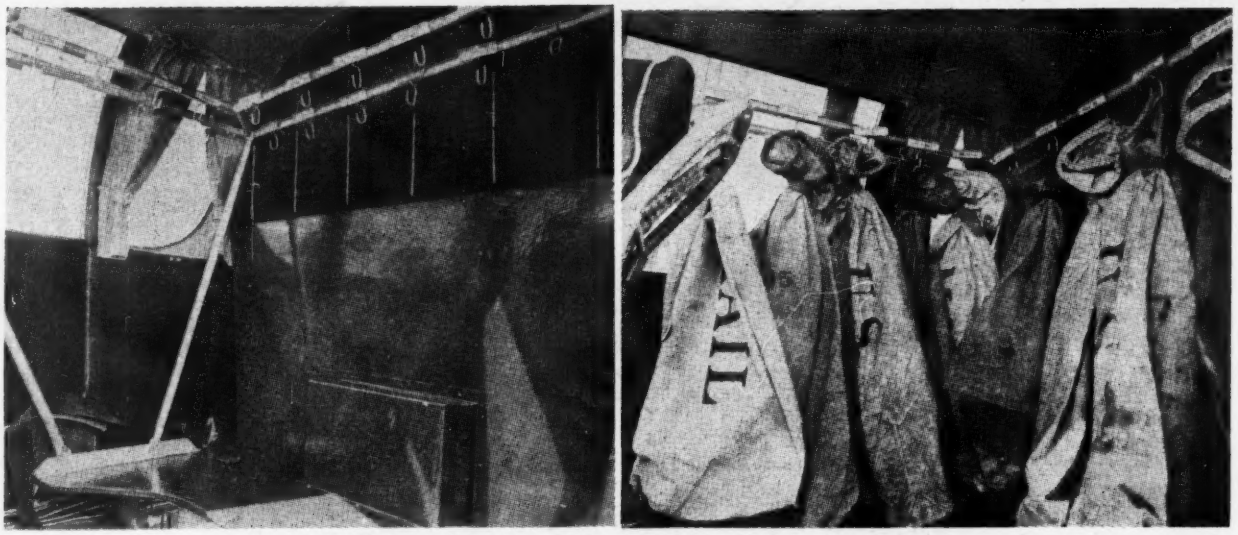
► **Eastern**—Reports it is offering the most frequent service ever flown between two cities in the world by one airline on its New York-Washington run. Company this month increased New York-Washington schedules to 32 roundtrips daily Monday through Friday and 29 daily on Saturdays and Sundays...Interline reservations agreement has been signed with Scandinavian Airlines System.

► **Mid-Continent**—Reports net profit for July of $1,395 against a $35,507 net profit in same month last year. Operating revenues of $519,836 in July were up 2 percent over preceding month and 9 percent over July, 1946. Passenger load factor was 56 percent in July, 1947, against 72 percent in July, 1946.

► **National**—Earned $372,697 net profit during fiscal year ended June 30, compared with $226,538 net profit in the previous fiscal year. Total operating revenue of $11,077,492 nearly doubled the $5,833,421 operating revenue for the preceding year, and revenue passenger mileage was up 80 percent ...Company was slated to extend DC-4 service to Tallahassee, Fla., and Mobile, Ala.

► **Northwest**—Has established a traffic office in San Francisco to tap California cargo business moving to the Orient.

► **Trans-Texas Airways**—Has contracted with Dallas Aero Service for all maintenance service on the company's planes.



UNITED PROPOSED HELICOPTER MAIL RACK

Two views of United Air Lines' helicopter mail rack shows interior arrangement of craft before and after mail is loaded. The rack was designed and built by UAL's engineering department to answer the need for fast handling of mail pouches in helicopter mail service. Photos are part of United's exhibit before the CAB in reference to proposed helicopter mail service in the Chicago area. The carrier, which recently purchased a Sikorsky S-51, has applied for four helicopter mail routes. Further hearings will be held.

Domestic Carriers Still Far In Red

Only three of 16 certificated trunklines show profit for first half of 1947.

Showing an aggregate operating deficit of almost $16,000,000 at the half-way mark, the nation's 16 certificated trunklines apparently are headed for their second consecutive year of record losses.

Only three domestic carriers—Eastern, Inland and National—were in the black for the six months ended June 30 as second quarter operating profits failed to wipe out more than a small fraction of the $18,746,000 deficit suffered in the first three months of 1947. Seven lines showed a profit during the second quarter of this year compared with two in the first quarter.

▶ **1946 Results**—During the second quarter of 1946 the 16 domestic trunklines earned over $5,000,000. This was sufficient to wipe out the first quarter operating deficit and replace it with a profit of almost $900,000 for the six-month period.

The three U. S. flag carriers on the North Atlantic run were all in the black during the second quarter of this year, but two of them —TWA and American Overseas Airlines— had operating losses of $1,536,000 and $1,680,000, respectively for the six months ended June 30. Pan American Airways' Atlantic division was well in the black for the first half of 1947.

Five of the six feederlines active during part or all of the first six months of this year showed operating deficits for the period, although second quarter losses were considerably below those of the first quarter. Southwest Airways had a $444,000 operating loss for the six months ended June 30; Empire Air Lines $208,000; Florida Airways $118,000 loss); Braniff, $270,000 loss ($852,000 Challenger Airlines $60,000. Pioneer Air Lines had a $69,000 operating profit in the same period.

▶ **Breakdown Given**—Second quarter operating results for the 16 domestic trunklines, with six-month figures in parentheses, are: American, $1,404,000 profit ($3,279,000 loss); Braniff, $270,000 loss ($852,000 loss); Chicago & Southern, $80,000 loss ($604,000 loss); Colonial, $137,000 loss ($548,000 loss); Continental, $66,000 loss ($323,000 loss); Delta, $169,000 profit ($110,000 loss); Eastern, estimated $1,980,000 profit (estimated $3,650,000 profit); Inland, $92,000 profit ($25,000 profit).

Mid-Continent, $7,000 loss ($106,000 loss); National, $241,000 loss ($105,000 profit); Northeast, $285,000 loss ($785,000 loss); Northwest, $56,000 loss ($2,182,000 loss); PCA, $31,000 loss ($2,246,000 loss); TWA, $23,000 profit ($3,414,000 loss); United, $254,000 profit ($4,877,000 loss); Western, $263,000 profit ($405,000 loss).

ICAO Weather Study

Preventive measures against aircraft accidents due to temperature accountability will be discussed by a specially formed group of aeronautical experts at an International Civil Aviation Organization meeting in Paris on Sept. 23. The importance of changes in atmospheric temperature and pressure on aircraft performance, underlined by recent airline mishaps, will be only one topic covered by the ICAO group when they consider action to increase the safety of airline flying under extreme weather conditions.

CAB SCHEDULE

Sept. 8. Oral argument in Arizona-New Mexico area case. (Docket 968 et al.)

Sept. 10. Hearing on CAB's investigation of TWA-Hughes Tool Co. relationships. (Docket 2796.)

Sept. 15. Hearing in Chicago Helicopter service case. (Docket 2384 et al.)

Sept. 15. Hearing on Southwest Airways' request for certificate amendment to permit beginning and/or ending trips at points short of terminals. (Docket 2861.)

Sept. 30. Oral argument in Northeast Airlines mail rate case. (Dockets 1932 and 1890.)

Oct. 7. Hearing involving additional Florida area service. (Docket 1668 et al.)

Oct. 20. Hearing on Resort Airlines' application to conduct all-expense "sky cruise" operations. Postponed from Oct. 6. (Docket 2377 et al.)

Oct. 20. Hearing on Pan American Airways' application for route consolidations and extensions in Latin America. (Docket 2811.)

Nov. 15. Hearing on board's investigation of consolidated airfreight tariff agreement. (Docket 2719.)

Nov. 24. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. (Docket 1956.)

Dec. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Aerovias Brasil Granted New Route Into U. S.

Additional competition over routes between the U. S. and Latin America was authorized by CAB recently with the issuance of a foreign air carrier permit to Aerovias Brasil (Empresa de Transportes Aerovias Brasil, S. A.).

The carrier will be permitted to operate between Brazil and the co-terminals Miami and New Orleans via Paramaribo, Dutch Guiana; Georgetown, British Guiana; Port of Spain, Trinidad; Caracas, Venezuela; Ciudad Trujillo, Dominican Republic; and Camaguey and Havana, Cuba. It will not carry local traffic between the U. S. and Cuba.

Magnifying a bearing's trouble spots

Taking a ball bearing apart *before it's made* is one sure way of getting the jump on service failure due to material weakness. So Federal metallurgists probe the microstructure of unhardened and hardened bearing steel, enlarge cross-sections as much as 2,000 diameters to evaluate their physical fitness, analyze the carbon, chrome and other alloy content and confirm their acceptance to Federal standards.

From the outset, through all of the over 100 individual manufacturing, inspection and cleaning operations that go into a Federal Ball Bearing, the pattern of performance-to-be is thoroughly gaged. *Every fourth operator is an inspector* on the alert for any trouble spot from one manufacturing operation to the next...ball to final assembly.

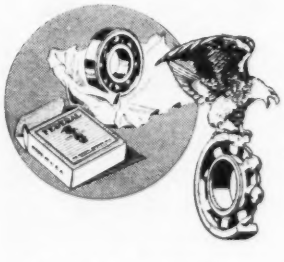
Whether it be tolerances, fit or finish—Federals are precision-engineered for frictionless operation...whatever the service requirement. And they're made in every type and size. Let the Federal representative nearest you tell you more about them. Send for catalog "K."

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, NEW YORK

Makers of Fine Ball Bearings

REPRESENTATIVES LOCATED AT

Detroit: 2640 Book Tower—26 • Cleveland: 402 Swetland Building—15
Chicago: 8 S. Michigan Ave.—3 • Los Angeles: 5410 Wilshire Blvd.—36



FEDERAL BALL BEARINGS

ONE OF AMERICA'S LEADING BALL BEARING MANUFACTURERS

FIRE-PROOF!

inside and out!

C.A.A. Listed

CMH FLEXIBLE METAL HOSE

For: Fuel, Oil, Instrument, Vacuum Lines,

CO_2 Lines downstream of directional control valve

CMH leadership in the science of FLEXONICS* has produced two types of flexible metal hose that have been conclusively proven valuable toward reducing fire hazards in flight:

1. CMH REX-FLEX *FIRE-PROOF* HOSE (CMH-FP-2-41)—has been granted a Fire-Proof approval by C. A. A. and is so listed.

2. CMH REX-FLEX *FIRE-RESISTANT* HOSE (CMH-FR-51)—complies completely with C. A. A. criteria for *fire resistant* lines.

In addition to internal and external flame tests, both types of hose have been subjected to standard vibration and burst tests. Fatigue life has been established by prescribed tests for vibration and pressure.

Both types are available in sizes from 3/8" to 1-1/2" I. D., with standard AN fittings. Have your Weight Engineer demonstrate the weight saving of CMH-FP-2-41, with nickel-steel fittings, over the usual forms of fire-resistant hose and aluminum fittings.

Undamaged after 10 hours of continuous internal fire . . .

In tests made by C. A. A., CMH *Fire-Proof* Metal Hose was subjected to 10 hours continuous internal fire—without damage!

In tests exceeding C. A. A. requirements as to temperature, pressure, vibration, etc. it was subjected for more than fifteen minutes to an external flame of over 2000° F—again without failure!

Here is safety not found in other types of hose construction!

*the science of **FLEXONICS** . . ."the controlled bending of thin metals for use under varying conditions of temperature, pressure, vibration and corrosion" . . . is exemplified in the basic products of Chicago Metal Hose Corporation.

"FLEXON" *identifies CMH products, which have served industry for more than 45 years.*

CMH

CHICAGO METAL HOSE CORPORATION

Maywood, Illinois • Plants: Maywood and Elgin, Illinois

NWA in Sea-Air Pact With Steamship Line

Northwest Airlines and American President Lines have completed arrangements providing maximum sea-air cooperation for the convenience of overseas travelers wishing to use both modes of transportation.

Under terms of the agreement filed with CAB for approval, offices and agents of both NWA and APL throughout the world will sell tickets for either air or surface travel or a combination of both. American President Lines operates mainly in the Pacific but also to other points on the world, while Northwest recently opened its new route to the Orient.

The two companies will accept each other's exchange orders, file joint air and sea fare tariffs with CAB and the Maritime Commission, and adjust commissions to a schedule profitable to both carriers. Round-trip overseas tickets will be offered at a 10 percent discount.

Commenting on the agreement, the Sea-Air Committee, vociferous advocate of a government policy which would permit steamship companies to control airlines, said it was a "gratifying step in the right direction."

New West Coast Link

West Coast Airlines was slated to begin service last week on its northern feeder link from Seattle to Bellingham, Wash., via Everett, Mt. Vernon and Anacortes.

SMORGASBORD

Scandinavian Airlines System is doing what comes naturally on its trans-Atlantic run out of New York. SAS hostesses now serve smorgasbord shortly after takeoff, and passengers can make a complete meal out of the delicacies or merely sample the assortment as an appetizer to the hot luncheon. Sample SAS smorgasbord: herring with sour cream, "Kalassill," Scandinavian caviar, smoked caviar, Scandinavian sardels, shrimp salad, lobster, ecrevisse, "Fagelbo," "gravlax," smoked eel, Westphalian ham, headcheese, liver paste, rolled veal, goat cheese and Old Swedish cheese. Note cabin altimeter for passengers in upper left.

TAN-O-LITE*

TOP IT OFF — WITH TAN-O-LITE!

A remarkable new upholstery fabric! Developed in cooperation with automotive and aircraft engineers, TAN-O-LITE has extraordinary strength . . . lightness . . . durability . . . beauty. Its stain-proof finish is easy to clean, never cracks or peels, withstands years of abuse. You'll admire its supple sleekness, its glowing, stay-bright colors, its rich leather effects. And this vinyl-coated fabric is completely FLAMEPROOF. Its versatility, its low cost makes it practical for a multitude of other uses, too. Write today for complete information and details.

BLACKBURN PRODUCTS, INC.

* Reg. U.S. Pat. Off.

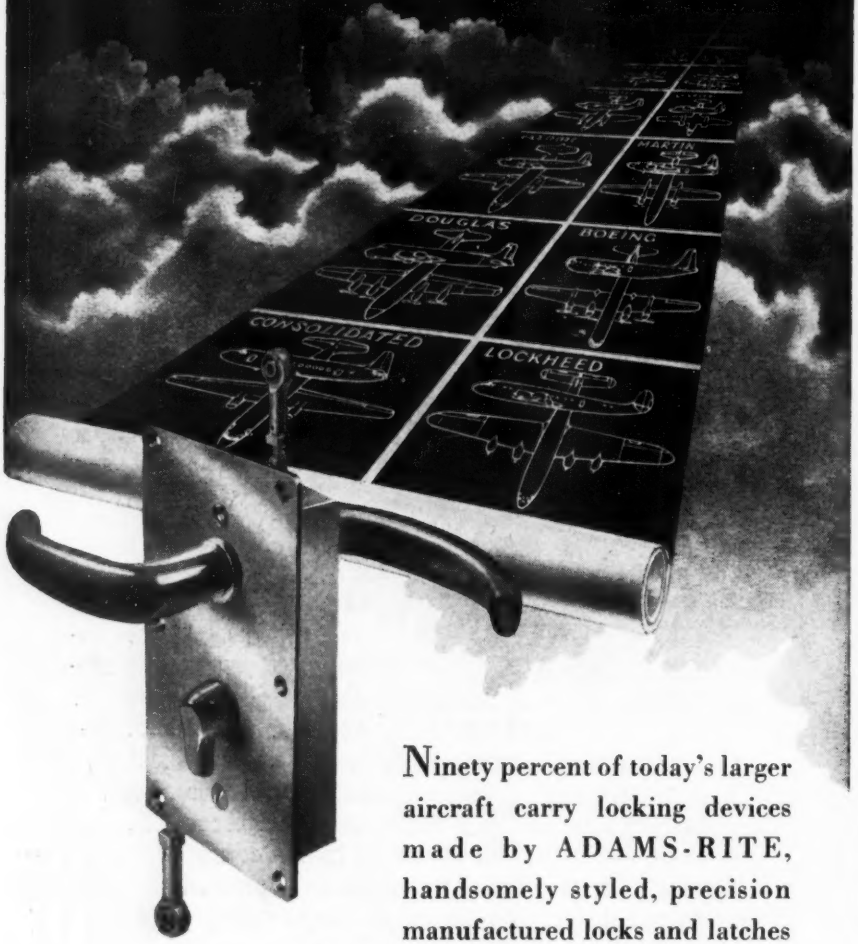
24 Avenue B, Newark, New Jersey

Makers of Simulated Leather

A BETTER PRODUCT TODAY—FOR A BETTER BUSINESS TOMORROW

Now known by name...

ADAMS-RITE



Ninety percent of today's larger aircraft carry locking devices made by ADAMS-RITE, handsomely styled, precision manufactured locks and latches that secure fuselage, compartment, lavatory, and bulkhead doors . . . mechanisms that were created and developed to meet specific problems encountered in aircraft design. ADAMS-RITE Aircraft Locks and Latches now wear the distinctive emblem that identifies ADAMS-RITE as the maker.

ADAMS-RITE engineers offer complete flexibility in engineering design and service in working with aircraft manufacturers in developing aircraft locks and latches, and are thoroughly familiar with the highly specialized requirements of the industry.

QUALITY HARDWARE FOR NEARLY HALF A CENTURY

ADAMS-RITE MANUFACTURING CO.

540 WEST CHEVY CHASE DRIVE, GLENDALE 4, CALIFORNIA, U. S. A.

Airport Activity Studied by CAA

New York's LaGuardia Field, Chicago Municipal Airport and Washington National Airport continue to hold top positions in handling scheduled air carrier operations, according to latest CAA statistics covering June, 1947.

Total landings and takeoffs by scheduled airline planes at LaGuardia during June numbered 12,942, against 11,528 in May and 12,300 in May, 1946. Scheduled airline operations at Chicago Municipal Airport aggregated 11,218 in June and at Washington National, 9,809.

Other airports with more than 4,000 landings and departures by scheduled airline planes during June were: Miami 6,701; Los Angeles 6,390; Pittsburgh 6,100; Detroit (Willow Run) 5,927; San Francisco 5,722; Cleveland 5,328; Dallas 5,302; Boston 5,230; Kansas City, Mo., 5,130; Philadelphia 5,060; St. Louis 4,453; Newark 4,073; Atlanta 4,060 and Jacksonville 4,020.

At LaGuardia, Chicago and Washington, scheduled air carrier operations made up the bulk of all landings and departures, but this was not the case at a majority of the 123 airports with traffic control towers operated by CAA. For all points, 1,744,188 operations were listed, of which only 248,817 (or less than 15 percent) were by scheduled air carriers; 175,565 by military aircraft; and 1,319,806 by civil aircraft (private flyers, flight schools, charter operatores, nonscheduled airlines, etc.).

CNRRA Air Transport Pushes Cargo Operations

CNRRA Air Transport, Chinese relief airline, has flown 850,000 freight ton miles during its first five months of operation. Headed by Maj. Gen. C. L. Chennault, former 14th Air Force and Flying Tiger commander, the carrier now uses 17 C-46 and 5 C-47 transports over a nonscheduled network linking the principal ports of Shanghai and Canton with the interior.

Relief supplies constituted 46 percent of the total cargo transported. Commercial goods accounted for 29 percent, mail 15 percent and special government missions 10 percent. Included in the cargo flown were medical supplies, food, vegetable seeds, Chinese currency, textiles, hides, hog bristles, tobacco and silver bullion.

CAT is financed by an UNRRA loan and operates under an agreement with the Chinese government that gives relief supplies top priority and permits use of backhaul and non-priority capacity for commercial cargo. Plan is for CAT to be self-liquidating and pay back the UNRRA loan from operational profits.

Initial operations have indicated large commercial cargo potential in the interior that is currently unable to reach coastal markets because of a lack of transportation.

A lot more Airplane

FLY AN ALL METAL Swift 125

$3,250 STANDARD
$3,750 DELUXE
F.A.F. DALLAS

If you want an airplane for practical, profitable cross-country flying . . . if there is a limit to the amount you can invest and your airplane must pay its way in time saved . . . then your answer is a new ***Swift 125.*** The Swift 125 is the ***only*** all-metal airplane on the market with low wing and retractable landing gear that sells for less than $6,000. Operating costs are low. All-metal construction with many replaceable sections keeps maintenance costs down to the minimum for a cross-country airplane.

But you will have to fly a ***Swift 125*** yourself to appreciate the reserve power of its 125 HP engine, its 140 miles per hour cruising speed and its natural stability and flying ease. Let your Swift dealer show you what we mean. ***Both the Standard and Deluxe Swift 125's are ready for immediate delivery.***

"The Swift is here to stay"

The Swift 125 is now being made by Texas Engineering & Manufacturing Co. in the former North American Aviation plant near Dallas, where 330 Swifts and 40% of the component parts of all Swifts were produced for the former Swift manufacturer. TEMCO, certified by the CAA and manned by former executives and employees of North American Aviation, has the financial strength, the manufacturing experience and the aviation "know how" to guarantee proven airworthy airplanes and dependable parts and service.

TEXAS ENGINEERING & MANUFACTURING CO.

BOX 6191-B — **DALLAS, TEXAS**

Visit your nearest Swift Dealer

These Swift Dealers are at your service. Others are being appointed so that Swift Sales and Service will soon be within easy flying distance of almost everywhere.

TEMCO SWIFT DEALERS

Alabama—Birmingham
Skycraft Sales Co.

California—Palo Alto
Palo Alto Airport, Inc.

San Diego
J. W. Dowdle
Air Terminal Bldg.
Lindberg Field

Taft
Engledow Repair Service
Kern County Airport

Georgia—Augusta
Cromelin's Air Activities
Daniel Field

Illinois—East St. Louis
Usselman's Air Service
Parks Metro. Airport

Indiana—Fort Wayne
Kelly Flying Service
Myers Field

Indianapolis
Central States Aero. Serv., 4800 W. 38th St.
Bob Shank Airport

Knox
Eichstaedt Aviation Co.

Kansas—Hutchinson
Wells Aircraft Sales

Louisiana—Shreveport
Southern Aviation Corp.

Maryland—Clinton
Capital Aircraft Sales

Michigan—Benton Harbor
Vernon E. Shoff

Detroit
Aircraft Sales Corp.
1044 Buhl Bldg.

Mississippi—Jackson
Ryan Aviation Supply Co.

Montana—Billings
Gillis Flying Service

New Hampshire—
Portsmouth
Yankee Airways

New York—Schenectady
W. F. Luke
Schenectady Co. Airport

New York City
Foreign Sales Rep.
Smith, Kirkpatrick & Co., Inc., 42 Broadway

Rochester
Aircraft Marine Co.
76 Stanfield Terr.

Nevada—Reno
Ossorghin Aviation Co.

Oklahoma—Oklahoma City
Catlin-Hutchinson Flying Ser., Will Rogers Airpt.

Pennsylvania—Pittsburgh
Walter J. Davidson Co.
Allegheny County Airport

So. Dakota—Rapid City
Rapid Aviation

Tennessee—Nashville
Brumley Flying Service
Fort Cornelia Air Park

Texas—Dallas
Hughes Aircraft Sales
Highland Park Airport

Fort Worth
American Flyers
Meacham Field

San Antonio
Alamo Airline Services
Municipal Field

Virginia—Richmond
E. J. Conklin Av. Co.
Byrd Airport

West Virginia—Charleston
Bassee Maiscott Av. Co.
318 Central Ave. South

Wisconsin—Milwaukee
Aviation Industries, Inc.
731 W. Wisconsin Ave.

DESIGNER

DESIGNER, 3 to 6 years experience in aircraft engine accessories, such as manifold pressure controls or carburetors. Prefer age under 30. Give full details on education, experience and previous positions.

B. S. in E. E. or Physics, 3 to 6 years experience in electronic circuit design (no radio). Ultimate responsibility development of electronic instruments and controls for aircraft. Prefer age under 30. Give full details on education, experience and previous positions.

THE BRISTOL COMPANY
PERSONNEL DEPARTMENT
WATERBURY 91, CONNECTICUT

WATER PILOTS

Leading New York operator has opening for two top flight experienced Pilots. Must have minimum of 2,000 hours.

P-1794, Aviation Week
330 West 42nd Street, New York 18, N. Y.

SELLING OPPORTUNITY OFFERED

SALES AGENCY—An opportunity to build a business of your own under the direction of a national aviation sales organization. Unusually high earnings possible (Upwards of $1000 per month). You must have sales ability, be willing to work hard and sincerely believe in the future of aviation. Sale of planes or equipment not involved. Five to ten thousand dollars required depending on the territory. A knowledge of aviation is helpful but you must not now be a flight operator. Only one appointment open from each non-competitive market area. Give full particulars of your background and how you can be reached by telephone to arrange a preliminary interview. National Flight System, Suite 1112-A, 610 So. Broadway, Los Angeles 14, Calif.

POSITIONS WANTED

IF YOU are looking for a superior company pilot, investigate this. Airline transport rating, all types of equipment. Age 29, married. PW-1772, Aviation Week, 68 Post Street, San Francisco 4, Cal.

HELICOPTER PILOT—29 years of age. Ten years experience in all types of flying. Graduate of Coast Guard helicopter school. Experienced on five different types. Available anywhere in thirty days. PW-1510, Aviation Week, 330 W. 42nd St., New York 18, N. Y.

CO-PILOT MECHANIC position wanted. Have following ratings—A&E, Commercial pilot, instrument, flight engineer. Nine years airline experience. Single, will go anywhere. PW-1829, Aviation Week, 520 N. Michigan Ave., Chicago 11, Ill.

FORMER FLIGHT engineer, ground school instructor, private pilot, licensed A&E, feeder airlines maintenance supervisor, desires responsible aviation position. Available immediately. PW-1865, Aviation Week, 330 W. 42nd St., New York 18, N. Y.

FOR SALE

No Reasonable Offer Refused

Ercoupe 1946, total time 230 hours. Extras include Sperry Directional Gyro and Artificial Horizon. Sensitive Altimeter, Clock. Always hangared-company maintained. Sperry Gyroscope Company, McArthur Field, Ronkonkoma, L. I., N. Y.

Stinson Reliant (AT-19)

Five Place, only 15 hrs., beautiful conversion-complete radio, VHF loop, reliable, economical, reasonable. Write or wire, Comdr., D. A. Seiler, SP-34, Apt. E., NAS, Norfolk, Va.

AIRCRAFT COMPONENTS WAR ASSETS SURPLUS

- ★ Propellers and Overhaul Parts
- ★ Carburetors and Overhaul Parts
- ★ Engine Accessories and Overhaul Parts
- ★ Aircraft Engines
- ★ Magnetos and Overhaul Parts
- ★ Special Tools
- ★ Test Equipment
- ★ Hangar Equipment
- ★ Parachutes

• Send Us Your Requests •

EIGHTH AIR DEPOT

Agents for W. A. A.

937 N. E. First Avenue
Miami, Florida
Telephone 9-9744

Sebring Air Terminal
Sebring, Florida
Telephone 336

FOR SALE

Executive Twin Cessna UC-78.

Only 100 hours on aircraft since major overhaul and conversion. 100 hours on engines and Hamilton Constant Speed Propellers since new. New empennage. New control surfaces. New red leather upholstered and sound proofed cabin. Licensed 5 place. Special 175 lb. baggage compartment with outside door. Janitrol heater. New battery. Bendix ADF, Lear radio transmitter, Lear auxiliary receiver, automatic antenna reel. Many other extras. Ship finished bronze color with red stripes. Cost over $26,000.00 less than two years ago. Will sell $11,000. Commercial Aircraft, Inc., P. O. Box 450, Ypsilanti, Michigan.

Bellanca 1946 Cruisair

Only 107 hours on A&E. Red and cream color. New license. Lear transmitter and receiver. Trailing antenna. Never damaged. Just like new. Price $5,000. Commercial Aircraft, Inc., P. O. Box 450, Ypsilanti, Michigan.

AIR FREIGHT CORPORATION FOR SALE

Complete corporate set-up with name that is a "natural". No liabilities. Presently inoperative. Reasonable offers entertained. Apply only if genuinely interested. Curiosity seekers save your postage.

P. O. Box 75, Grand Central Annex
New York 17, N. Y.

Rising Sun SCHOOL OF AERONAUTICS

ESTABLISHED 1930
"Built Upon the Success of It's Graduates"
GOVT. C.A.A. and VETERAN APPROVED
ENROLL NOW FOR NEXT CLASS.
2206-16 E. HUNTINGDON ST., PHILA., PA.

SPECIAL
RADIO COMPASS LOOPS
Type LP-21-LM

Used with SCR-269G and ARN-7 Compass Systems
or
Incorporate these units in your new designs and production.

All units in original cartons, export packed in lots of six.

Samples available at $14.50 each net. Wire or phone for prices in lots of 100 or more.

Many other similar items in stock, write for complete listing.

SERVO-TEK PRODUCTS CO.
247 Crooks Ave. Clifton, N. J.
ARmory 4-2677

SEE US FOR APPROVED REPAIR STATION 188

SAE INSTRUMENTS

NEW—USED—ALL TYPES—SALES—REPAIRS

STANDARD AIRCRAFT EQUIPMENT COMPANY

Hangar 35, Roosevelt Field, Mineola, L. I., N. Y. Garden City 8753

1830-92's

New 1830-65's Converted to 1830-92's	$8,500.00
Newly Overhauled 1830-65's Converted to 1830-92's and Approved for Scheduled Operations	$2,750.00
1830-92's Newly Overhauled by Army	$1,900.00
1830-65's Newly Overhauled by Army, Converted to 1830-92's	$1,750.00

Parts For R-2000-7's & R-1830-92's. All parts & Engines Packaged for Long Time Storage & Export.

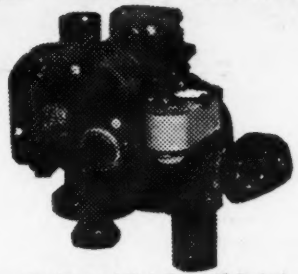
MEMO: We are handling increasing quantities and types of engines and engine parts. Rapid inventory changes prevent keeping up with our stock in these ads. For your greatest advantage we strongly recommend that you

KEEP US INFORMED OF YOUR NEEDS

STEWARD-DAVIS COMPANY, 13501 S. Western Avenue, Gardena, Calif.

CABLE: STEDAV. Phone: Plymouth 5-5144 or MEnlo 4-4579

$300. NAVIGATOR'S SEXTANT ONLY $17.50!



The famous A10-A Fairchild Sextant

This fine instrument is ideal for surface and air navigation; it uses the artificial horizon bubble and the automatic averaging device which alone increases precision and speed in observations several hundred percent over other types. We furnish this fine instrument complete with fine grain wood carrying case (lock type), hanging bracket, battery case (for night shots), wrench, free Army Tech. manual on Celestial navigation and if you want it, the extra power telescopic attachment. Please mention the telescope when ordering, however. Slightly used, the price is only $17.50.

We also offer Link A12 Sextants.....$17.50
Bausch & Lomb A8A Sextants.....$32.50
Quantity discounts available to dealers and exporters.

Pilot's sun glasses, metal rimmed, gold plated, green, with case..... $4.95
Pilot's flying goggles, clear lense, metal rims, rubber mold..... $4.95
Radio headphones, AAF type..... $1.95
Radio Hand michrophones, Type T-17..... $2.95
Helmet, cloth, with radio headphones, rubber ear cups, both for..... $2.75
ADF (Radio Direction Finder, Automatic), SCR269F, brand new, complete including 24 volt inverter, f.o.b.....$150.00

AERO PARTS SUPPLY
Dept AW, Municipal Airport, Houston, Texas

Finished Solid Scale Models

"Realism in Miniature"

The model shown above is an unretouched photo of the Martin "China Clipper" constructed for the private collection of a Pennsylvania publisher. Wingspread of model 32". (Scale: ¼" equals 1')

- All types of aircraft scale models custom constructed with precision and craftsmanship to your specifications or designs.
- These models are ideally suited for promotional work, personal or business gifts.
- Let us know of your requirements. Quotations submitted promptly. No obligations. All inquiries, and data forwarded, held in strictest confidence.

CHRISTIE BATLAS & CO.
P. O. Box 160-AW Morgantown, W. Va.

New Hamilton Governors

Models: 1A2, 1A4, 1Q12, 4G8 4G10, 4K11 and many others. All packed in original factory cartons. Will ship on approval. Priced far below market. Wire for quotation.

Anderson Aircraft Co.
1700 Sawtelle Blvd.
Los Angeles 25, California

SPUR GEAR HAND HOISTS

Converted surplus bomb hoists. Unused. Stationary. Will lift up to 350 lbs. a total of 18 feet. Multi-strand wire rope can be fed out of any one of three drum housing openings, so as to lift, or pull horizontally or down. Bargain at $9.95 each post paid in U. S., or send for illustrated folder.

IRELAND & VICE
P. O. Box 146-H Auburn, N. Y.

AIRCRAFT PARTS, ASSEMBLIES, COMPONENTS and ACCESSORIES

Available for Immediate Delivery from Stock

ALCOHOL PUMPS
744-4, 744-6, 565-3
D-13382, D-7818, 100-4

AUTOMATIC PILOTS
A3, A3A, A5, C1

CARBURETORS
PD-12F2, PD-12F5,
PD-12H2, PD-12K6,
PT-13G1, PT-13G5,
1900-CPB-3

C-47, DC-3, C-54, DC-4

PARTS & ASSEMBLIES
Bungee-DC-3-2116965
Collector Rings-DC4
5174842 & 5174529
Eng. Mount Bolts—DC3
1116115, 1117771
Int. Wrench, Bolts—DC3&4
2076904 thru 2076907 Ser.
NAS-140 thru NAS-150 Ser.
Landing Gear Bolts—DC3
AN14-93, 1116409,
1116410, 1116955,
1117078, etc.
Special Screws—DC3 & 4
1027300 & 1027307 Ser.
1027997 & 1029421 Ser.
1029679 & 124630 Ser.
Shear Bolts—DC3 & 4
111904 Ser. all Dash Nos.
Shock Mounts—DC-3
SK1292-1, 1118876, etc.
Special Bolts—DC3
1000402, 1046452,
1117059, 1131032,
1139096, 1143386,
1143538, 1205414,
134808, 2116354, &
all dash Nos.
Special Washers—DC3 & 4
115888 124682 &
143908 Series.
Window Assemblies—DC3
5115404 & 5115404-1

ELECTRONICS
BC-221, BC-357,
BC-733D, BC-1206,
BC-438, SCR-269,
SCR-274, etc.

ENGINES—At Min. Prices

0-435-1	R1820-G205
R680-9	R1830-43
R755-9	R1830-65
R985-48	R1830-90C
R985-50	R1830-92
R985-AN-1	R2600-13
R985-AN-3	R2800-43
V1710-81	R2800-51
V1710-99	R2800-75
R1820-97	R3350-35

FUEL PUMPS
G-9, G-10, TFD-100,
TFD-8100, TFD-8200,
CH4103-23, Ceco 9103.

GENERATORS
M2, 0-1, P-1

INSTRUMENTS
Comp. Inventory of all types, incl.
Driftmeters B-3 & B-5.

INVERTERS
MG-149, MG-149F.
MG-149H, MG-153,
and MG-153F.

MAGNETOS
SF14LU-7 & SF14LU-8
SF14LC-7 & SF14LC-8
SF9LU-3, -7 & -8
SF14LN-8, etc.

OXYGEN EQUIPMENT
A9, A8, A12, & AN6022 Regulators.
G1, D2, F1, & A4 Bottles
K1, & A-13 Gauges.

PROP. FEATHER. PUMPS
54772-2, 54772-21, 1E280,
1E521, etc.

PROP. GOVERNORS
4G8-G23G, 4G8-G15,
4G8-G13, 4L1-GIJ,
4K11-GOJ, 4K11-GOL.

STARTERS
G-6, G-6A, E-80, F-2,
JH-3R, JH-4ER,
JH-5F, JH-5-B, etc.

VACUUM PUMPS
3P207JA, 3P211JA,
119626-610-2

VALVES
3V-216H, 3V-217H,
613-2, 613-6, 557-5, etc.

WINDSHIELDS—PLEX
For Aeronca, Cubs, Taylorcraft, Stinson, Culver Cadets, Luscombes, etc.

H. & E. DISTRIBUTING CO., INC.

OKLAHOMA CITY OKLAHOMA

Adm. Offices:
P. O. Box 3596
Ph: 4-5109

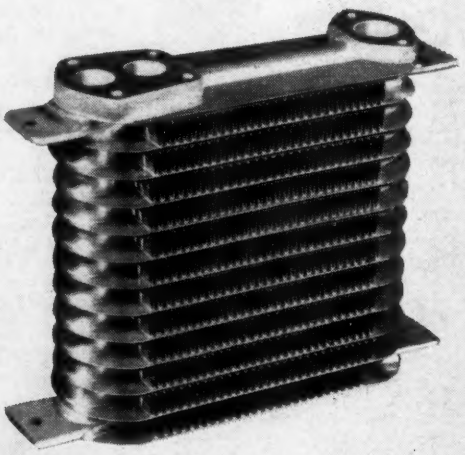
Warehouses:
4025 N. Barnes
Ph: 5-9617

Write for our Catalogs, and Address all Inquiries to Administrative Offices

AIRBORNE *Durability*

Harrison Oil Coolers promote engine dependability, reduce engine wear, by holding oil temperatures within the required range, from take-off to landing. Efficient design and sturdy construction qualify Harrison Oil Coolers for this important assignment. They are compact, rugged, lightweight—built to withstand vibration and to maintain uniform performance under the most severe operating conditions. Harrison engineers will be glad to recommend an oil cooler that meets your needs. Harrison Radiator Division, General Motors Corporation, Lockport, New York.

from take-off to landing



HARRISON

OIL COOLERS

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—September 8, 1947

Adams-Rite Mfg. Co. 68
Agency—Sylvester-Meeder Advtg. Corp.

Aerial Products, Inc. 48
Agency—James J. McMahon, Inc.

Albertson & Co., Inc. 45
Agency—E. W. Sann & Associates

Allen Mfg. Co., The 52
Agency—Norris L. Bull Advtg.

Allied Products Corp. 62
Agency—Chas. M. Gray & Associates

Ambrose Aviation Co., Frank 73
Agency—Steedle, Rankin & Boyle, Inc.

American Broach & Machine Co. 9
Agency—Holden, Clifford, Flint

Arens Controls, Inc. 48
Agency—The Frank Nahser Agency

Avco Mfg. Corp. 42
Agency—McCann-Erickson, Inc.

Aviation Activities, Inc. 51
Agency—Rogers & Smith

Beech Aircraft Corp. ..... 4th Cover
Agency—Erwin & Wasey & Co., Inc.

Bell Aircraft Corp. 41
Agency—N. W. Ayer & Son, Inc.

Bendix Aviation Corp. (Pacific Div.) 31
Agency—The Shaw Co.

Bendix Aviation Corp. 17
Agency—MacManus, John & Adams

B. G. Corporation, The ..... Front Cover
Agency—Albert Frank Guenther Law

Blackburn Products, Inc. 67
Agency—Mears Advertising, Inc.

Carnegie-Illinois Steel Corp. 38, 39
Agency—Batten, Barton, Durstine & Osborn

Champion Spark Plug Co. 49
Agency—MacManus, John & Adams

Chicago Metal Hose Corp. 66
Agency—Russell T. Gray, Inc.

Curtiss Wright Corp. of N. Y. 19
Agency—Chas. Dallas Reach Co.

Delco-Remy 50
Agency—Campbell-Ewald Co.

Dumont Aviation & Supply Co. 56
Agency—Jordan & Lo Buono

Edison, Inc., Thomas A. 23
Agency—Schuyler Hopper Co.

Electric Storage Battery Co., The 10
Agency—Geare-Marston, Inc.

Electrol, Inc. 61
Agency—Victor A. Smith

Erie Meter Systems, Inc. 8
Agency—Davies & McKinney

Federal Bearings Co., Inc., The 65
Agency—Fred Wittner

General Controls Co. 43
Agency—The McCarty Co.

Goodrich Co., The B. F. 3
Agency—Batten, Barton, Durstine & Osborn

Gulf Oil Corp. 5
Agency—Young & Rubicam, Inc.

Handy & Harman 24
Agency—Peterson & Kempner, Inc.

Harrison Radiator 72
Agency—Campbell-Ewald Co.

Irving Air Chute Co., Inc. 46
Agency—Comstock-Duffes & Co.

Keuffel & Esser Co. 4, 27
Agency—St. George & Keyes, Inc.

Koppers Co., Inc. 20
Agency—Vansant, Dugdale & Co.

Long Co., Inc., The S. A. 8
Agency—McCormick-Armstrong Co.

Marquette Metal Products Co. 57
Agency—Belden & Hickox

Mercury Aircraft, Inc. 73
Agency—Chas. L. Rumrill & Co.

Permanente Products Co. 6
Agency—Young & Rubicam, Inc.

Pittsburgh Plate Glass Co. 36
Agency—Maxon, Inc.

Revere Copper & Brass, Inc. 32
Agency—St. George & Keyes, Inc.

Searchlight Section 70, 71

Solar Aircraft Co. 28
Agency—Dan B. Miner Co., Inc.

Sperry Corp., The ..... 2nd Cover
Agency—Witte & Burden

Sperry Gyroscope Co., Inc. ..... 3rd Cover
Agency—Chas. Dallas Reach Co.

Stewart-Warner Corp. 53
Agency—MacFarland-Aveyard & Co.

Surface Combustion Corp. 35
Agency—The Griswold-Eshleman Co.

Texas Engineering & Mfg. Co., Inc. 69
Agency—Albert Evans

United States Electrical Tool Co., The 54
Agency—Julian J. Behr Co.

U. S. Plywood Corp. 58
Agency—Marschalk & Pratt Co.

United States Steel Corp. 38, 39
Agency—Batten, Barton, Durstine & Osborn

Vickers, Inc. ..... 2nd Cover
Agency—Witte & Burden

Vic Pastushin Industries, Inc. 73
Agency—Jordan & Lo Boono

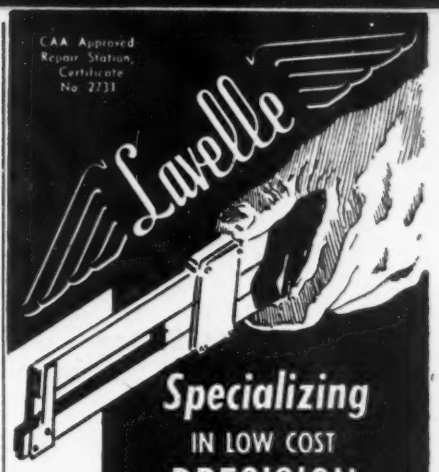
SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT
Positions Vacant 70
Selling Opp. Offered 70
Positions Wanted 70

EDUCATIONAL
Schools 70

EQUIPMENT
(Used or Surplus New)
For Sale 70-71



Specializing
IN LOW COST
PRECISION
MANUFACTURING
for
AVIATION · RADAR
and ALLIED
INDUSTRIES

• TOOL DESIGN, ENGINEERING SERVICE
• PRECISION SHEET METAL ASSEMBLIES and PARTS

LAVELLE AIRCRAFT CORPORATION
NEWTOWN, Bucks County, PENNA.

Stop rivet leaks with SLEEVE RIVETS

Replace leaky rivets in integral fuel tanks and hulls with the thoroughly tested and approved fluid-tight sleeve rivets. Approved by Army, Navy and CAA. Used on DC-4, DC-6, B-36, Skystreak and others. . . . . *Write for Maintenance Bulletin*

VIC PASTUSHIN INDUSTRIES, INC.
5671 Century Blvd., Los Angeles 45, Calif.

WORLD-WIDE distributors of multi-engine transport type aircraft, engines, their components and accessories. Agent for WAR ASSETS ADMINISTRATION. Write, wire or telephone your requirements.

EXPORTERS
AIRCRAFT-ENGINES
COMPONENTS

FRANK AMBROSE AVIATION COMPANY

39-01 Main Street, Flushing, L. I., N. Y. . . . Cable Address: AIRAMBROSE
Branch Warehouse: Oakland Municipal Airport, Oakland, Calif.
Agents for Frank Ambrose Aviation (Canada) Ltd., Dorval Airport, Montreal, Canada and Frank Ambrose Aviation, S. A., Panama City, R. P.
Established 1923 *U. S. Export License No. 191*

EDITORIAL

We Prefer U. S. Airlines

Despite the addition of huge luxury liners like England's two queens to the steamship lanes, trans-Atlantic air services by the three American international carriers continue to improve.

American Overseas and Pan American are starting daily non-stop flights from New York to the British Isles. No foreign company is even approaching this standard. In schedule frequency, operating and maintenance efficiency, crew selection and training, airway aids and communications standards, and bad weather approach and landing systems, U. S. airlines are well ahead of their foreign competitors.

But because the U. S. companies still are plagued by complications in passenger treatment, the foreign carriers are wooing substantial numbers of American passengers.

AVIATION WEEK July 28 observed that foreign operated airlines over the Atlantic are "making up in frills and creature comfort for what they lack in operating efficiency." We also wrote that "the American public doesn't inquire too much about technicalities which are not mentioned in the ads."

These references aroused vigorous protests, naturally, and the truthfulness of the statements on inferior operations was challenged.

It so happens, however, that on Aug. 19 a well known U. S. air transport official, highly respected by the industry for his knowledge of the subject, sent a letter to several other executives, mainly with U. S.-owned international airlines, acknowledging his belief that standards of foreign air transport companies generally are inferior to those of our own international lines.

The letter is so important to the traveling public, as well as to air transport officials who did not see it, that we quote a substantial portion of it:

"Fundamentally, in international operations we are faced with a very serious problem which in my estimation will be more keenly felt competitively by the summer of 1948 but is becoming more and more apparent today. The consensus of opinion leads me to believe that our passenger service aboard aircraft, as well as the handling of passengers at terminals, does not compare with the same service being given by the foreign flag international carriers. This includes ticketing, handling of baggage, service aboard aircraft, including preparation and dispensing of meals and the various other little niceties which we term service. . .

"Regardless of the service delivered by the international foreign carriers, I as an individual would not ride on any of their lines with the probable exception of one on which I would accept passage if necessity dictated. This is based upon my knowledge of the training of pilots, maintenance, and the safety level, but I am not John Q. Public. He sees only the service and, from all outward appearance, the foreign international carriers are flying the same equipment and the outside of the airplane is just as clean and in some instances cleaner than our aircraft.

"Consequently, he tells his friends of the wonderful service and food provided aboard the foreign carriers, in comparison to the poor service and poor food afforded by the U. S. international carriers. This problem is not a fictitious one, nor is it an unrealistic problem, but is a very vital one and we only have to turn the pages of history back to a parallel case of the American passenger shipping industry prior to World War II, in comparison to the ships operated by the French, British, Dutch, Germans, Swedes, and Norwegians. The safety code observed aboard the foreign ships was much inferior to the safety observed aboard the American ships, but regardless of this fact the American public as a whole traveled aboard the foreign ships because they were afforded better service, better food, and better recreational facilities.

"Competition is most evident this year. This is particularly true over the Atlantic but is becoming more evident in the South Atlantic and in the Pacific.

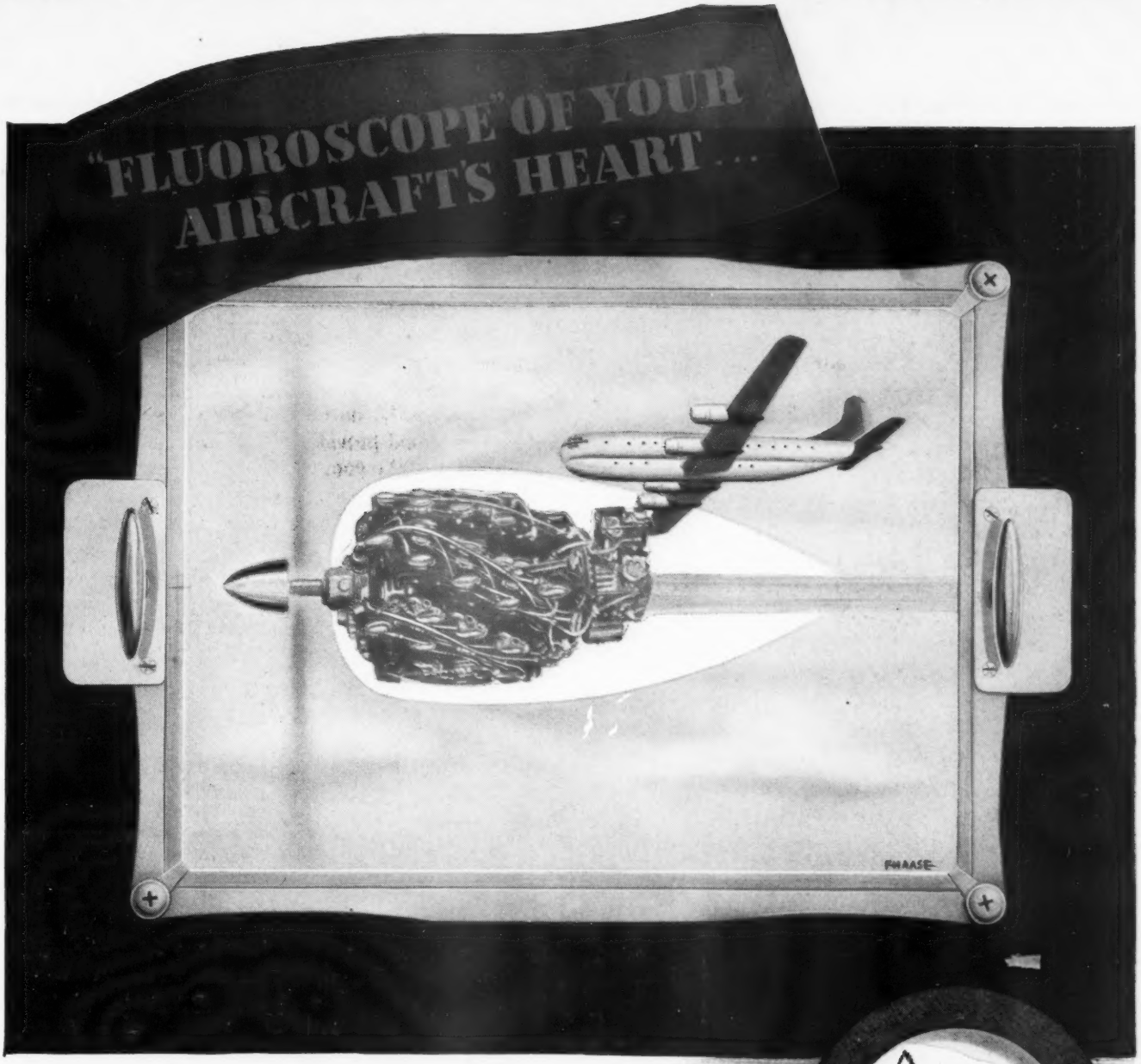
"Once the impression is created that U. S. international carriers afford the public poor service in comparison to the foreign operated international carriers, it is going to be exceedingly difficult to dispel this impression, regardless of advertising. Consequently, it is much easier to attempt to improve the service today in order to hold the market than to lose the market and attempt to regain it."

This is a man speaking from a wealth of experience, not only in the United States. He is primarily interested in arousing fellow air transport executives to the need of re-evaluating personal service to the passenger. Machine-minded Americans are keenly conscious of the need for mechanical and operational perfection, but in the transportation field they have usually under-rated the business value of personal service and comfort.

We have every confidence in the ability of U. S. airlines to continue to excel the foreigners operations-wise, and to match their standards of comfort and service.

As the letter writer points out, however, until our airlines do raise their standard of creature comfort, we shall see hundreds of Americans flocking to foreign owned airliners in preference to our own, which—if these luxury-loving travelers only knew it—are built, operated, and maintained under the highest standards in the world, by the most skilful personnel in the world.

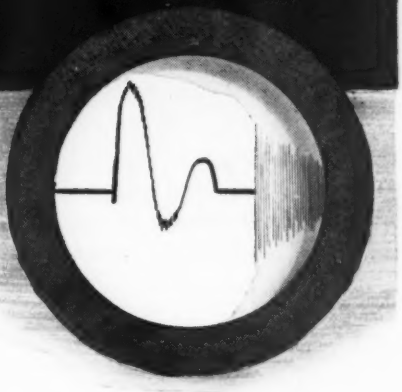
ROBERT H. WOOD



PROVIDED BY NEW SPERRY ENGINE ANALYZER

■ The new Sperry Engine Analyzer will enable your flight engineer to keep his *eye on the pulse* of his engines—promptly visualize the slightest irregularity in engine function. In the analyzer indicator the flight engineer can examine at any time during flight, patterns that show the characteristics of engine vibration, ignition system performance, and synchronization between magnetos and between engines. These characteristic patterns *detect, locate* and *identify* the malfunctions and impending failures that may occur during flight operation.

■ When the airplane comes into an airport, specific engine maintenance needs are already known. Small mechanical corrections can then be made in minutes instead of the hours formerly required to locate the cause of malfunction. This results in an increased number of possible flying hours per day and greater reliability in meeting schedules.

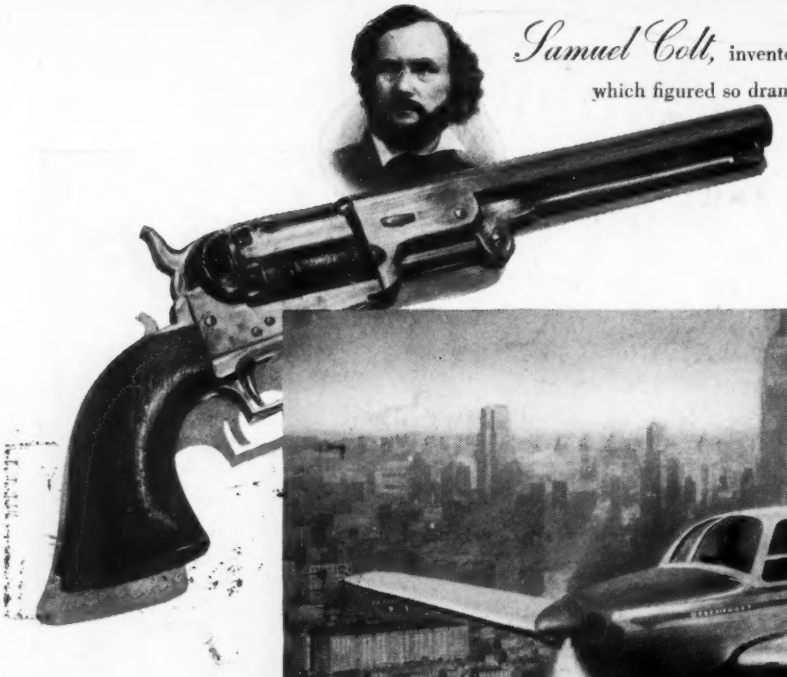


■ Our Aeronautical Department will be glad to supply complete details.

Sperry Gyroscope Company, Inc.

EXECUTIVE OFFICES: GREAT NECK, NEW YORK • DIVISION OF THE SPERRY CORPORATION

NEW YORK • LOS ANGELES • SAN FRANCISCO • NEW ORLEANS • CLEVELAND • SEATTLE



Samuel Colt, inventor of the revolver—the great "equalizer" which figured so dramatically in our conquest of the West

Top Speed, 184 mph; Cruising Speed, 172 mph; Range, 750 miles

Walter H. Beech, pioneer in aeronautics, who produced the Beechcraft Bonanza as a modern "equalizer" in business transportation.

A Great New "Equalizer" for the Business frontier... the BONANZA

ONE INDIAN on a horse could send a dozen arrows at a Texas Ranger before the Ranger could dismount to use his long rifle. But to this unequal duel came Samuel Colt's "equalizer"—the six shooter—which stopped the Rangers' enemies in their tracks.

To today's business frontier comes an equally potent "equalizer"—the Bonanza, an airplane built for business, giving town and city businessman alike new mobility and range.

The four-place Bonanza is a fast airplane, cruising at 172 mph, but does it with the economy of 165 hp at a cost as low as one cent per passenger mile! Add the Bonanza's limousine-like luxury, its quietness, and its easy maneuverability in and out of the smallest fields—and you have air transportation that is tailored to fit the businessman's needs!

The Bonanza comes fully equipped—two-way radio, landing lights, instruments, heater, electric retractable landing gear, flaps, controllable propeller and other refinements. Your Beechcraft distributor will be glad to demonstrate it—and to discuss its adaptability to your transportation needs. We are still filling a large backlog of orders. Additional ones will be filled in sequence.

Beech Aircraft

CORPORATION WICHITA, KANSAS, U. S. A.

TECHNOLOGY DEPARTMENT

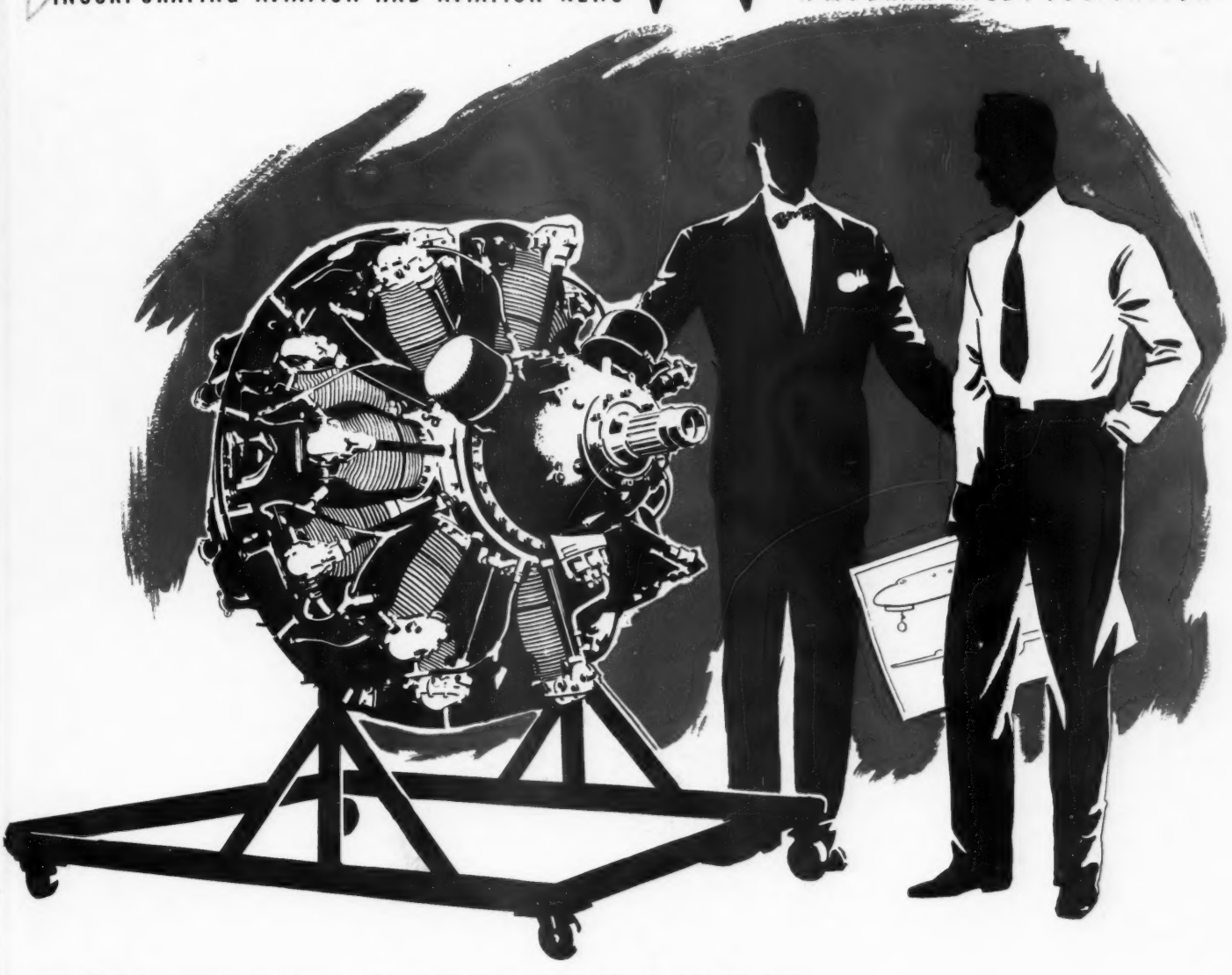
AVIATION WEEK

SEPT. 15, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A McGRAW-HILL PUBLICATION

PUBLIC LIBRARY
SEP 15 1947
DETROIT



INTRODUCING A NEW TWIN WASP

To meet the need for an engine in the 1650 horsepower class that is as rugged and dependable as its famous predecessors, Pratt & Whitney Aircraft introduces the new R-2180.

Built into this engine are many of the proved features of the more powerful Wasp Major and Double Wasp engines, plus numerous design improvements contributing to economy of operation and new ease of maintenance.

PRATT & WHITNEY AIRCRAFT

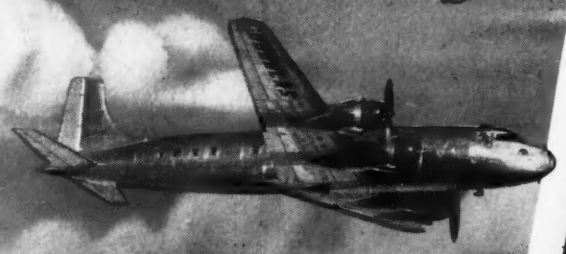
EAST HARTFORD, CONNECTICUT

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

DETROIT PUB LIBRARY
TECHNOLOGY DPT
95 PUTNAM AV
DETROIT MICH

ELECTRICAL EQUIPMENT • INSTRUMENTS • MICARTA PULLEYS, STRUCTURAL PARTS • FANS, HEATERS, COOLERS • JET PROPULSION

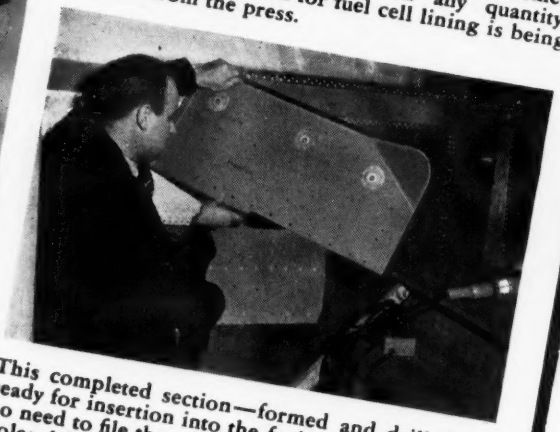
AIRBORNE



Big Birds take *Micarta* under the wing

Micarta "444" lines fuel cells in DC-4's and DC-6's

Westinghouse supplies Micarta "444" in flat sheets for molding in your own shop or will supply formed pieces, completely fabricated, in any quantity. Here, a formed section for fuel cell lining is being removed from the press.



This completed section—formed and drilled—is ready for insertion into the fuel cell. Since there is no need to file the edges or de-burr the mounting holes, labor is saved and the installation simplified.

Here's another case that highlights your advantages in applying Micarta to aircraft. The material used is Micarta "444" . . . supplied in flat sheets for post forming; the quantity . . . 365 square feet per plane; the application . . . lining fuel cells in the wings of Douglas DC-4's and DC-6's.

Micarta's rare combination of physical properties led to its selection for this vital job. A strong, lightweight laminate, it resists heat, cold, humidity and chemicals . . . and can be easily formed or machined with ordinary tools.

Micarta "444" has proved superior to the material previously used because, 1st—it effects a 14 percent weight saving; 2nd—formed parts are more easily inserted in the wing structure; and 3rd—it has less abrasive action on the gasoline bag.

This is another example of how Westinghouse—producer of a wide variety of aviation products—is helping the aircraft industry. For the complete story of this service ask your nearest Westinghouse office for booklet B-3775. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94765

Westinghouse

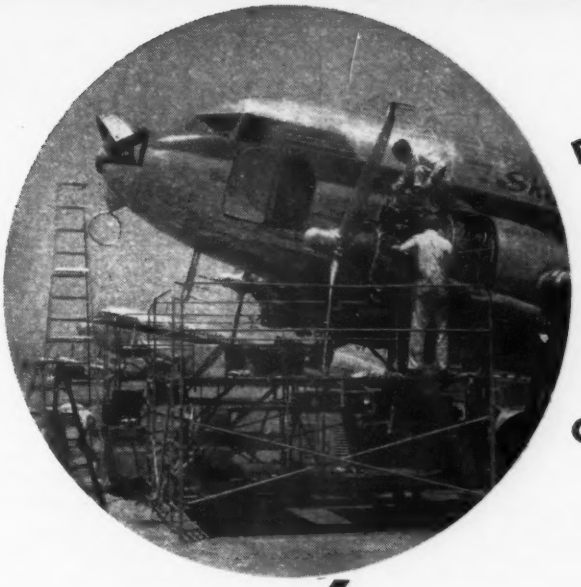
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Leader in Aviation Equipment

ON THE GROUND

ENGINE STARTERS, BATTERY CHARGERS • AIRPORT LIGHTING • TEST EQUIPMENT • RADIO AND MICROWAVE APPARATUS • LAMPS

For fast...efficient maintenance and repairs...consult one of these



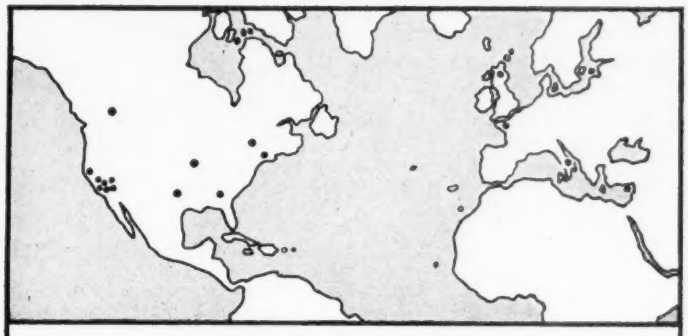
DC-3

DC-4

C-47

C-54

Douglas APPROVED SERVICE CENTERS



1. DC-3, C-47, DC-4, C-54
Douglas Aircraft Company, Inc.
Santa Monica, Calif.

2. DC-3, C-47, DC-4, C-54
Aviation Maintenance Corp.
7701 Woodley Avenue
Van Nuys, Calif.

3. DC-3, C-47, DC-4, C-54
Grand Central Airport Company
1310 Airway, Glendale, Calif.

4. DC-3, C-47
Hughes Aircraft Company
Florence Avenue at Teale St.
Culver City, Calif.

5. DC-3, C-47
Northrop Aircraft Company
Hawthorne, Calif.

6. DC-3, C-47
Timm Aircraft Company
Metropolitan Airport
Van Nuys, Calif.

7. DC-4, C-54
Matson Aviation Maintenance Co.
Oakland Municipal Airport
Oakland, Calif.

8. DC-4, C-54
Texas Engineering & Mfg. Co.
Grand Prairie, Texas

9. DC-3, C-47
Southern Airways Company
Municipal Airport, Atlanta, Ga.

10. DC-3, C-47, DC-4, C-54
Aircraft Service Corporation
Bradley Field, Windsor Locks
Conn., and Miami, Florida

11. DC-3, C-47
Northwest Industries Limited
P.O. Box 517
Edmonton, Alberta, Canada

12. DC-3, C-47
Canadair Limited, P.O. Box 6087
Montreal, Quebec, Canada

13. DC-3, C-47
Scottish Aviation Limited
Prestwick Airport
Ayrshire, Scotland

14. DC-3, C-47
S. A. B. C. A.
13 Rue de Brederode
Brussels, Belgium

15. DC-3, C-47
Societa per Azioni Fiat
Turin, Italy

16. DC-3, C-47
Northwestern Aeronautical Co.
Holman Field, St. Paul 1, Minn.

The world-wide network of Douglas Approved Service Centers is taking shape. Here operators will find skilled men trained in servicing and repairing Douglas transport aircraft. Work is done fast... it is done well... and it is also done at minimum expense.

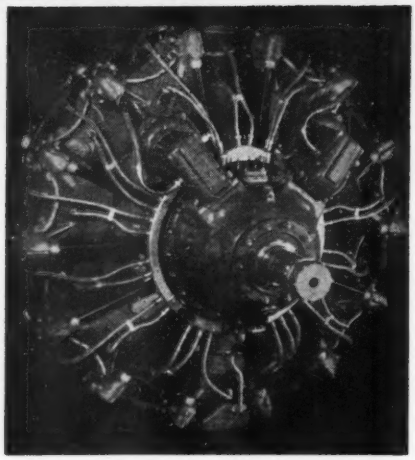
Only these *approved* centers have access to Douglas field and factory technical assistance, quality control methods, and the latest information from Douglas so vital in making repairs letter-perfect.

WARRANTED DOUGLAS PARTS are now available for the repairing and servicing of Douglas airplanes. Look for the Douglas emblem on these warranted Douglas parts.

For more complete information, write:

DOUGLAS AIRCRAFT COMPANY, INC.
SANTA MONICA, CALIFORNIA

DOUGLAS



Titeflex

Ignition Shielding

A Principal Factor in Safe Flying . . .

Titeflex IGNITION SHIELDING, developed for all types of aircraft, successfully eliminates radio interference caused by the ignition systems and auxiliary electrical wiring. Proper shielding assures clear communications and thereby contributes substantially to safe flying despite adverse weather conditions.

Titeflex is constantly developing newer types of conduits and assemblies to meet the most exacting requirements for the latest aircraft being flown today.

Titeflex engineers are familiar with the many problems encountered in shielding of aircraft wiring. They are pleased to cooperate in the development of special projects and invite you to call upon them for personalized engineering of your particular problem.

Aviation Catalog No. 115 sent on request.

Titeflex, Inc.

510 Frelinghuysen Ave., Newark 5, N. J.

Exclusive Manufacturers of Titeflex high quality products for more than 30 years

Sales Offices { CHICAGO CLEVELAND DETROIT PHILADELPHIA LOS ANGELES BOSTON SAN FRANCISCO TORONTO

Vol. 47 No. 11

AVIATION WEEK

Sept. 15, 1947

INCORPORATING AVIATION AND AVIATION NEWS

The Aviation Week	7	World News	35
News Digest	8	Sales & Service	36
Headline News	11	Briefing for Dealers	42
Financial	16	New Aviation Products	47
Engineering - Production	17	Transport	49
Industry Observer	18	Editorial	62

Robert H. Wood
EDITOR

John Foster, Jr.
EXECUTIVE EDITOR

Merlin H. Mickel
MANAGING EDITOR

Robert B. Hotz ..... News Editor
Irving Stone ..... Technical Editor
William Kroger ..... Production
Alexander McSurely ..... Sales & Service
Charles L. Adams ..... Transport Editor
Robert McLarren ..... Engineering
Albert E. Smyser, Jr. ..... Engineering
Scholer Bangs ..... Pacific Coast Editor
Katherine Johnsen ..... Congress
Herbert F. Powell ..... Special Assignment
Blaine Stubblefield ..... Special Assignment
Marie Adams ..... Editorial Assistant

Researchers, F. L. Peterson, V. Giaculli, A. L. Scaffi, W. L. Lanier

Executive and Editorial Offices: 330 W. 42nh St., New York 18, N. Y.; National Press Bldg., Washington 4, D. C.

Domestic News Bureaus: Atlanta 3, Rhodes Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S. Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St Louis, Salt Lake City and 43 other cities.

Foreign News Bureau: London, Paris, Berlin, Prague, Moscow, Shanghai, Bombay, Montreal, Ottawa, Mexico City, Buenos Aires, Correspondents in Berne, Caracas, Santiago, Pieping, Tokyo, Zurich, Rome and over 100 other cities.

ECONOMICS STAFF
Dexter M. Keezer, Sanford S Parker, William F. Butler, John D Wilson

Robert F. Boger
PUBLISHER

J. C. Anthony
MANAGER

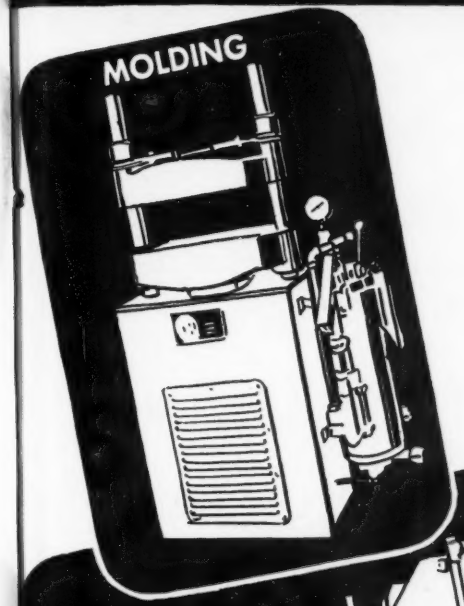
Business Manager, J. G. Johnson *Art Director,* Henry L. Sandstrom

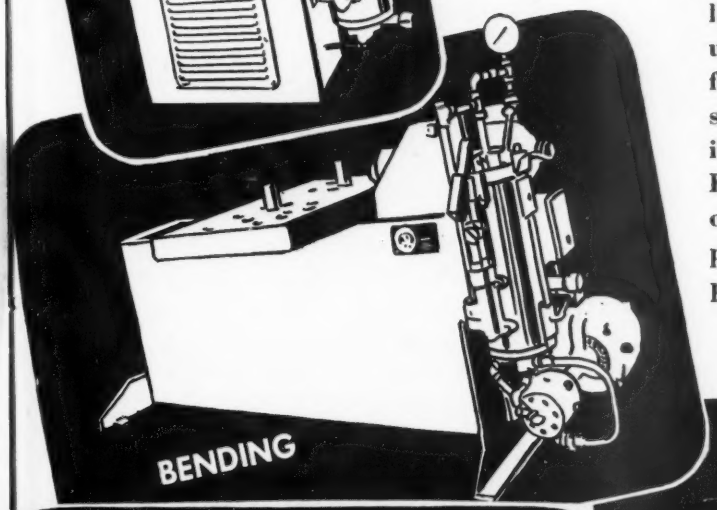
R. W. Martin, Jr., *Sales Manager;* M. J. Storz, New York; L. J. Biel, Philadelphia; V. K. Dissette, Cleveland; R F. Greene, Detroit; A. B. Martin, Chicago; W. G. Ashmore, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, St. Louis, Boston and London.

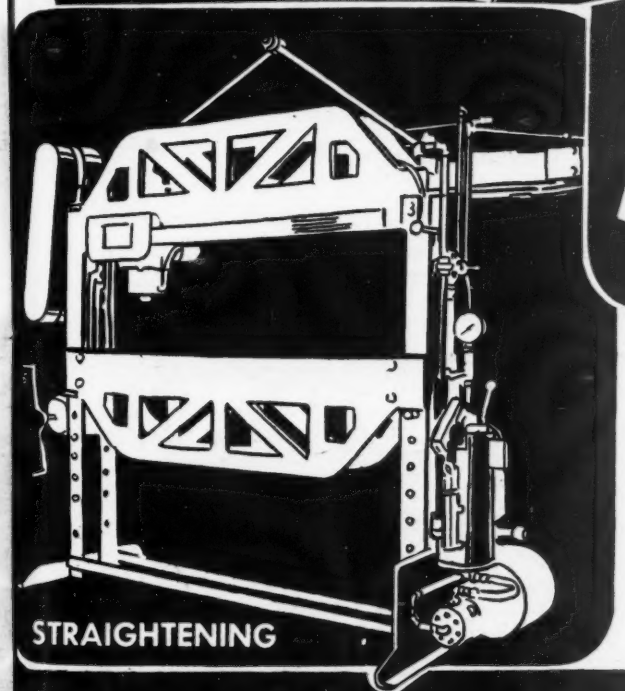
McGRAW-HILL PUBLISHING CO., Inc., Publishing Office, 99-129 N. Broadway, Albany, N. Y. Return postage guaranteed. Editorial and executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 69 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes-Haverty Bldg., Atlanta 3; 621 S. Hope St., Los Angeles 14; 738-9 Oliver Bldg., Pittsburgh 22. JAMES H. McGRAW, Founder and Honorary Chairman; JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to President; J. E. BLACKBURN, Jr., Directo rof Circulation . . . Aviatioon Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $5 a year, $8 for 2 yr., $10 for 3 yr. Canada, $6 for 1 yr., $10 for 2 yr., $12 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate positio nand company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 47, Numbe r10. Printed in U.S.A. Cable address, "McGraw-Hill New York." Member A.B.C. Copyright 1947, McGraw-Hill Publishing Co. Aviation Week is indexed in "Reader's Guide to Periodical Literature" and in "Industrial Arts Index." Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AERONAUTICAL ENGINEERING and ARCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

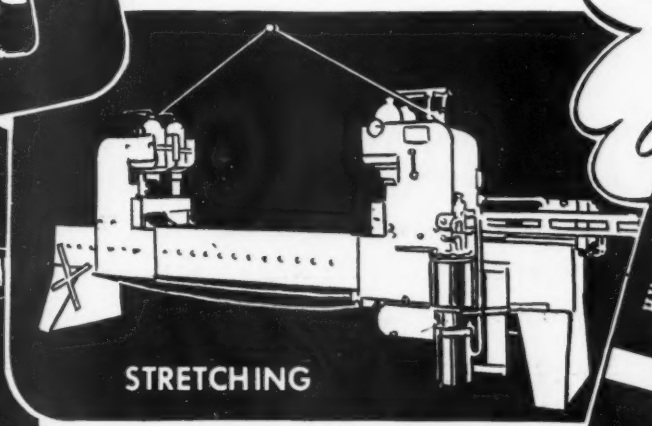
Name the JUB!

There's a KRW PRESS that can do it BETTER... for LESS









● Illustrated here are four KRW Hydraulic Press adaptations that are typical of many being built by KRW today. All are priced from 30 to 200% less than competitive makes of comparable tonnages or capacities. All are motor-driven and incorporate the time and production proven features that have made the standard KRW Hydraulic Arbor Presses... *the most widely used press of their type in America.* Take the KRW Sliding Head Straightening Press as an example. This type KRW Press has been effecting tremendous labor savings in fabricating plants where plate must be "trued up" before it is processed or fabricated. The heavy, hand method formerly used was archaic and very costly by comparison. The same story holds true of KRW Stretcher-Levellers, KRW Blanking and Forming Presses, KRW Compression Molding Presses, KRW Bending Presses and many others. To save your time and ours, tell us your problem in terms of what you want to accomplish. We'll give you an answer and furnish literature that is pertinent to your needs. Mail the coupon now.

Write for the **NEW KRW** *Catalog.....*

K. R. Wilson, 215 Main Street, Buffalo 3, N. Y. 58

Please send your catalog. We are particularly interested in your

Bending Presses ☐ Compression Molding Press ☐
Straightening Press ☐ Stretcher-Leveller ☐ Forming and Blanking Press ☐

Firm Name .....

Address .....

City and Zone..... **State**.....

K·R·WILSON

215 MAIN ST. · BUFFALO 3, N. Y.

~ *And Here's Another*

Four-hundred-pound landing gear forging for one of the world's largest airplanes.

The forging know-how as developed by Wyman-Gordon during the last 60 years takes in stride forgings that not long ago seemed impossible to produce.

Put your forging problems up to WYMAN-GORDON, **greatest name in forging.**

WYMAN-GORDON

Forgings of Aluminum, Magnesium, Steel

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS - - - DETROIT, MICHIGAN

THE AVIATION WEEK

BOARD OVER BARREL—Even before the war, it has been considered that the two greatest areas for domestic expansion of air transport have been local service and cargo. Despite the tremendous difficulties encountered to date in developing those two fields, observers now feel they "Ain't Seen Nothing Yet."

CAB has the real problems; twin toughies that must be faced in the very near future. No more time to wait and see what develops. One member of the Board, Harllee Branch, has served definite notice that he will oppose certification of any more feeder lines. Another, Clarence Young, is leaning that way. Key figure, as in so many transport problems these days, is Chairman James Landis.

Tip-off to a potential reversal of board policy is the Great Lakes Area decision. No new line was certificated for Ohio, as was sought by several applicants. CAB took care of Ohio service by giving TWA additional stops in the state. Entire theory of local service airlines has been that trunk carriers were not interested in low traffic-generating stops, could not serve them as efficiently as special carriers.

STUNTED GROWTH?—Expansion of local service lines, as far as numbers is concerned, may have already been cut short. Josh Lee and Oswald Ryan probably will continue to favor new feeders in the three remaining cases. But if Young swings firmly to Branch's side, the die may have been cast.

Landis has made no secret of his belief that the number of airlines should be reduced by mergers. This has generally been in connection with trunk carriers. Should that philosophy extend down to local service lines, the days of feeder expansion are over.

CUT-RATE CARGO—A somewhat similar problem tortures the Board on cargo. If it sits tight and lets the 12-cent-per-ton-mile commodity rate proposed by Capital, American and United go into effect on Oct. 5, it may mean curtains for most of the uncertificated cargo carriers.

Not only is this rate as low as that of the uncertificated carriers, but behind it is the considerably greater financial and operational resources of the certificated lines. It is taken for granted that other lines will follow Capital, AA and UAL in dropping the rates. And again Landis is in the middle. He has envisioned large-scale air-freight services, tramp steamers of the air, so to speak. This nearly implies cargo carriage by companies devoted only to that service.

Observers of the cargo field gloomily predict it will be impossible for uncertificated cargo carriers to beat the competition of certificated lines at the proposed low rates.

BUCKING THE BALANCE SHEET—At the root of both the feeder and cargo situation are the grim facts of economic life, regardless of hopes and dreams of CAB or the industry. Economics has thrown safety investigation, also, for a loss—with a substantial assist from CAA's cumbersome procedures.

Not a single recommendation of the Presidents special safety board has been put into effect.

CAA was charged with drafting regulations which CAB's safety bureau would circulate and put into effect. Only one regulation has been drafted. This regulation—on temperature accountability—was to go into effect Sept. 5. It has been deferred until Oct. 15—past the time when the airlines would suffer the heaviest financial losses from reduced payloads.

Temperature accountability is only one part of the "T" (for Transport) category regulations the airlines dislike. Studying balance sheets and performance data of new aircraft they have concluded it is almost impossible to build a two-engine airplane that will meet requirements of that T category and still make money. Manufacturers back them up.

PILOTS AND PLANES—The pilots, primarily concerned with safety, are puzzled by the T category for a different reason.

The DC-3 will not meet the existing T category provisions. So it has been ruled off the airways, now in 1951, after the time had been extended twice previously. Meanwhile, the pilots wonder why it is considered safe while not meeting regulations, or whether the regulations are at fault.

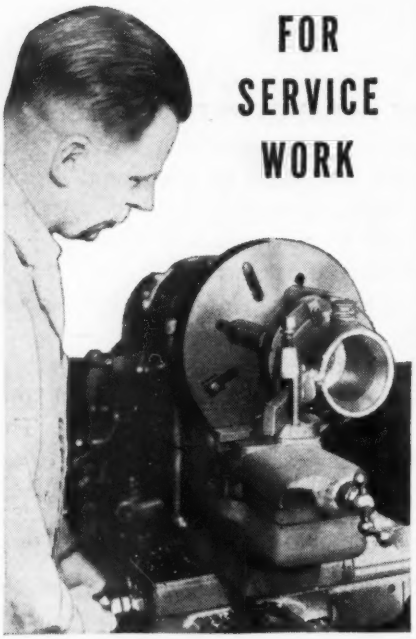
Actually, many airline pilots right now prefer to fly the DC-3 to newer, four-engine planes. The reason; "We know all about that airplane."

Pilots will concede they do not yet know all the answers to four-engine operation. And in the case of the DC-6, they do not feel they are getting full opportunity to get acquainted with the most powerful commercial plane Douglas has built. Check-out time is brief—as little as 10 hours. And on a long-haul, such as coast-to-coast, there will be only one or two landings. Under those circumstances, co-pilots are getting little or no time actually at the controls.

Economics are forcing the airlines to put into service newer planes after a minimum of familiarization flying. To get payloads under the T category, the planes must depend on new devices. Pilots see margins of safety dwindling, depending almost entirely upon mechanical, not human, ability. They wonder.

Factory Precision

FOR SERVICE WORK



South Bend Precision Lathes deliver the same accurate, dependable performance on service work that they do on original parts manufacture. Urgently needed replacement parts can be made quickly, economically, and to original factory tolerances. Many worn parts can be reconditioned. More and better service jobs can be turned out in less time, and with greater profit, with these versatile machine tools.

PROMPT DELIVERY from your local distributors' stock or early factory delivery.
PRICES start at $145.00, f. o. b. factory — average price increase is less than 15 per cent over prewar level — quality improved.
TIME PAYMENTS — moderate finance charge — 25% down — 12 months on balance.

SOUTH BEND LATHE WORKS
Building Better Lathes Since 1906
503 E. MADISON ST., SOUTH BEND 22, IND.

WRITE FOR CATALOG 100-F
Describes South Bend Precision Toolroom and Quick Change Gear Lathes with 9", 10", 13", 14½", and 16" swings.

South Bend Lathes

NEWS DIGEST

DOMESTIC

John Dwight Sullivan, World War I pilot and New York attorney, was elected executive vice president of the National Air Council, successor to the Air Power League.

Dr. Walter Ramberg was appointed chief of the mechanics division of the National Bureau of Standards, succeeding Dr. Hugh Dryden, who resigned to head NACA research program.

Lieut. Gen. Ross E. Rowell, wartime Commandant of Marine Corps aviation, died in San Diego at the age of 62, after 40 years of service. He is generally credited with originating dive bombing in the U. S. having used the maneuver in Nicaragua against Rebel natives in 1927. He commanded the famed Marine "Hell Divers" who developed tactics using the Curtiss F8C-4 Helldiver, the first designed-for-the-purpose U. S. dive bomber. Rowell was the first Marine aviator to attain the rank of General.

President Truman named Maj. Gen. William H. Draper to be Undersecretary of War and Maj. Gen. Alfred M. Gruenther to be director of a new joint Army-Navy-Air Force staff of 100 to be created.

FINANCIAL

Bell Aircraft Corp. reports a net loss of $210,934 for the first half of 1947 on sales of $9,141,997. Federal tax refund amounted to $525,000. Cost of sales was $9,377,936 and experiment and development costs totalled $499,995 to create the deficit.

Minneapolis Honeywell Regulator Co. paid a 50 cent dividend to holders of common stock on record Aug. 25 and 80 cent dividend to holders of convertible preferred series A on record Aug. 30.

FOREIGN

Australian Premier J. B. Chifley stated: "Apart from aircraft already on order, no further purchases of aircraft involving dollar expenditure will be authorized. The expenditure of dollars on spare parts for aircraft will also be closely supervised."

Swissair plans to inaugurate passenger and cargo service between New York and Geneva, Switzerland this week with Douglas DC-4 transports.

Pan American Airways is slated to resume flights between San Francisco and Hong Kong on Sept. 24 with three trips weekly.

England Claims Highest speed seat ejection with 500 mph. plus performance from two-seat converted Gloster Meteor. The release was at 12,000 ft. from a patented Martin-Baker ejector seat.

Dr. Keith N. E. Bradfield, chief airport engineer of Australian department of civil aviation, was appointed to two-year term as Australian representative to ICAO in Montreal.

IF YOU'RE WORKING ON

JET ENGINES

SUPERIOR DRAWS SMALL METAL TUBING from SPECIAL HEAT AND CORROSION RESISTANT ALLOYS (UP TO 5/8" O.D.)

The problems posed by rocket and turbo-jet programs include the development of new and improved metal alloys.

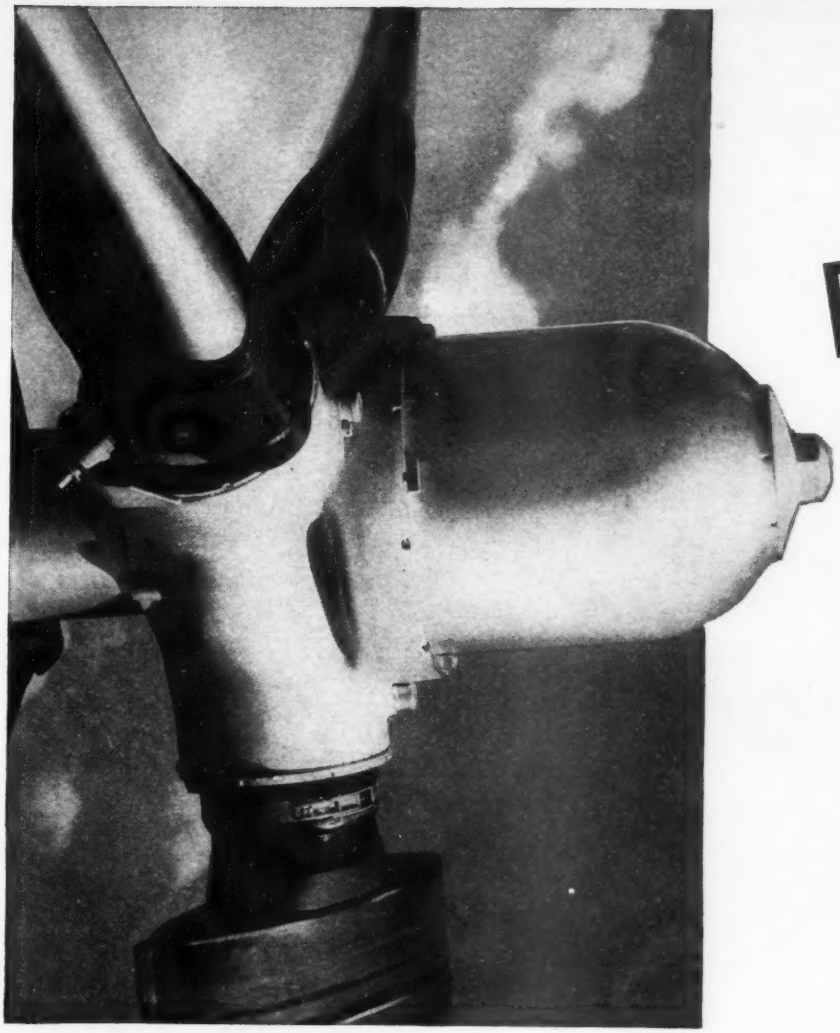
The Superior Tube Company has made it possible to use new heat resistant and corrosion resistant alloys *in tubing form,* by the research and development of techniques of cold drawing. We can and will aid you in your experimental program. Bulletin #31 on Superior Fine Small Tubing will be sent upon request.

THE BIGGER NAME IN SMALL TUBING *Superior*

See our CATALOG in SWEET'S FILE

SUPERIOR TUBE CO.
2030 Germantown Ave.
NORRISTOWN, PA.

For Superior Tubing on the West Coast call Pacific Tube Company, 5710 Smithway Street, Los Angeles 22, California. ANgeles 2-2151.



ONLY DEPENDABLE METALS belong in the air

Hamilton Standard Propellers, like the one shown above, attest to the reliability of Nickel alloy steels used in their construction.

Plowing through the air at speeds of from five to nine miles per minute, controllable-pitch propellers must withstand not only high centrifugal stresses, at both normal and sub-zero temperatures, but also high air loads and high vibratory stresses. Furthermore the blade material should be highly resistant to fatigue stresses and to erosion by water, cinders and ice.

To assure these important qualities the engineers of the Hamilton Standard Propellers Division of the United Aircraft Corporation specify Nickel-chromium-molybdenum steel. This steel responds readily to heat treatment to provide a minimum yield strength of 135,000 p.s.i.

In the hub, the barrels, spiders and rotating cams are made of a direct hardening Nickel-chromium-molybdenum steel. Stationary cams and gear segments are forged from a 5% Nickel case hardening steel to provide hard, wear-resistant surfaces, over strong, tough cores.

When you need steel with extra qualities, think of Nickel alloyed steels. Send us details of your problem for our recommendations.

EMBLEM OF INCO SERVICE

TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information is yours for the asking. Write for "List A" of available publications.

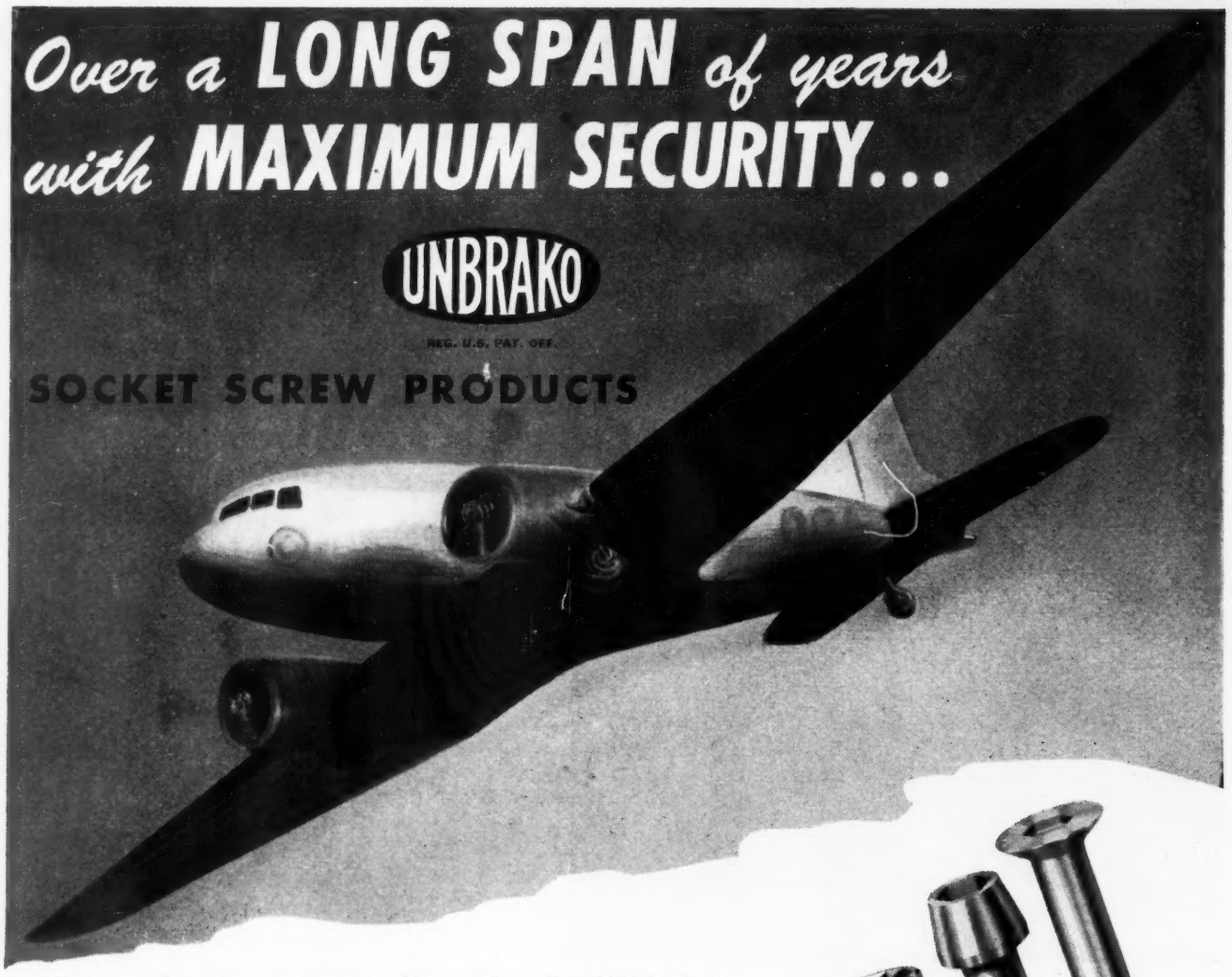
THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Over a LONG SPAN *of years with* MAXIMUM SECURITY...

UNBRAKO

REG. U.S. PAT. OFF.

SOCKET SCREW PRODUCTS



For years, the extreme accuracy and top notch quality of "Unbrako" Socket Screw Products have been in keeping with the requirements of the Aviation Industry — and that's why these same "Unbrako" Products are being specified more and more by aviation engineers and designers.

The "Unbrako" Internal Wrenching Lock Nut (A) . . . a superb and official approved safety nut; the "Unbrako" Internal Wrenching Bolt (B) and the 100° Flush Head Socket Bolt (C) meet the "nth" degree of precision, tensile and other stringent requirements of the aviation industry — because our entire plant is manned by skilled craftsmen and equipped with the finest and most modern production, precision and metallurgical equipment.

Knurling of Socket Screws originated with "Unbrako" in 1934.

The Knurled Head of the "Unbrako" Socket Head Cap Screw provides a slip- and fumble-proof grip — be the fingers and heads ever so oily — therefore, it can be screwed-in faster and farther before it becomes necessary to use a wrench.

PAT'D AND PAT'S PEND.

The Knurled Cup Point of the "Unbrako" Socket Set Screw makes It a SELF-LOCKER . . . the point digs-in and holds fast . . . regardless of the most chattering vibration. Yet, it can be easily backed-out with a wrench and used over and over again.

The Knurled Threads of this "Unbrako" Socket Set Screw makes it a SELF-LOCKER. Too — for use where the points such as flat, cone, oval, half- and full-dog which do not lend themselves to knurling must be used.

PAT'D AND PAT'S PEND.

You can't screw socket screws in or out without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Hollow Handle Key Kit which contains most all hex bits.

KITS PAT'S PEND.

OVER 44 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

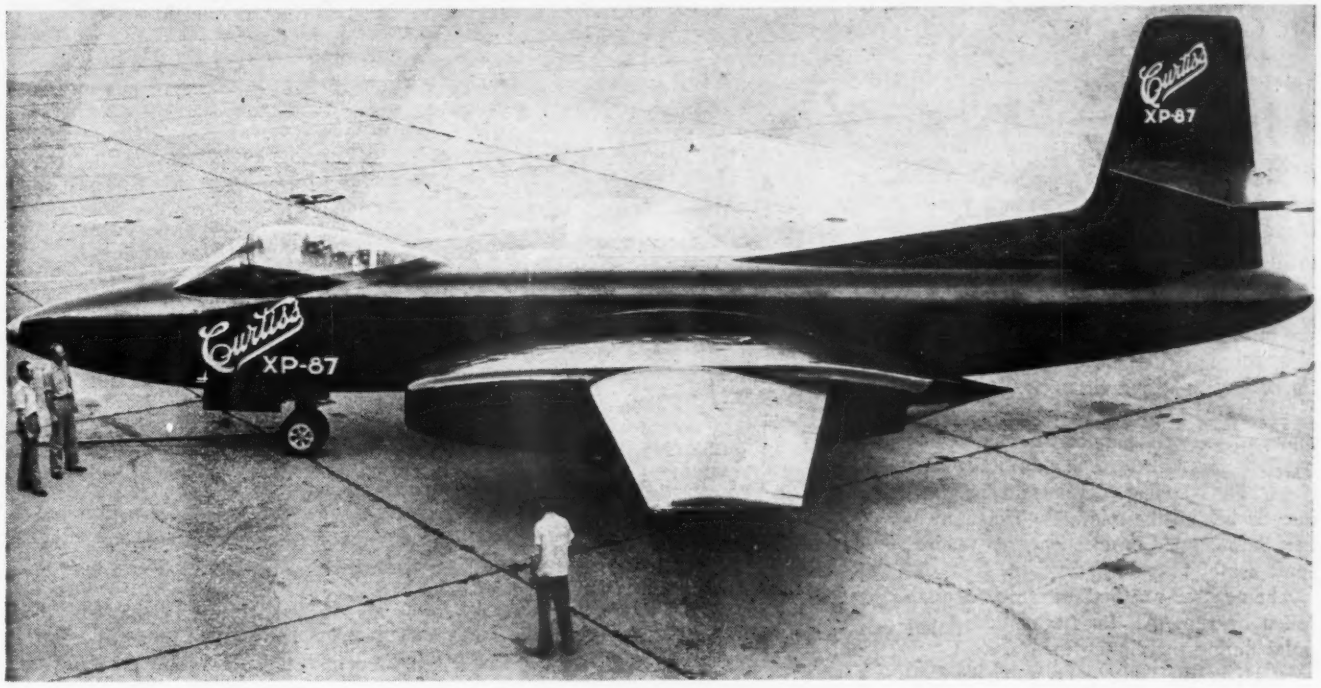
JENKINTOWN, PENNA., BOX 566 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

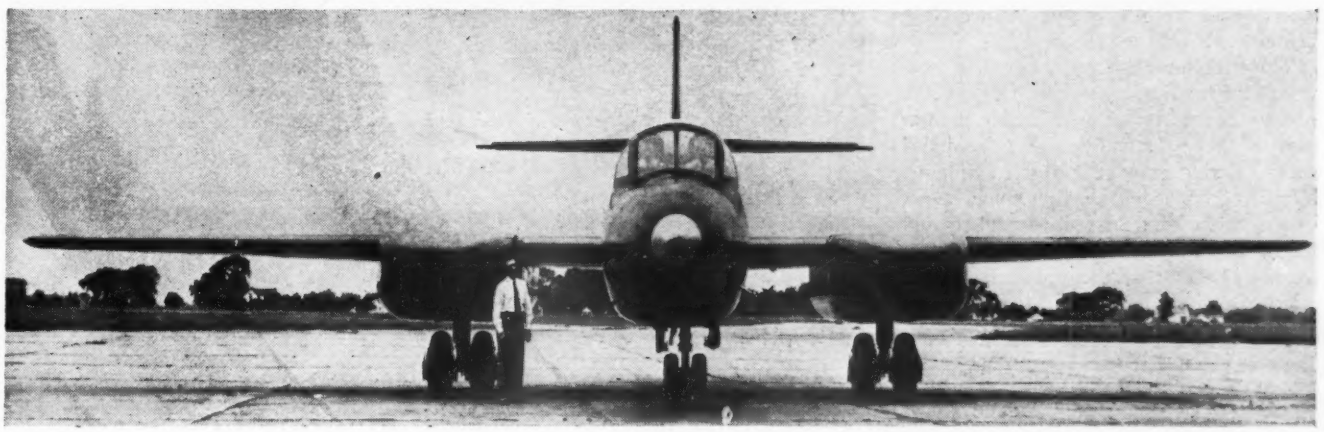
VOL. 47 • NO. 11

AVIATION WEEK

SEPTEMBER 15, 1947

INCORPORATING AVIATION AND AVIATION NEWS





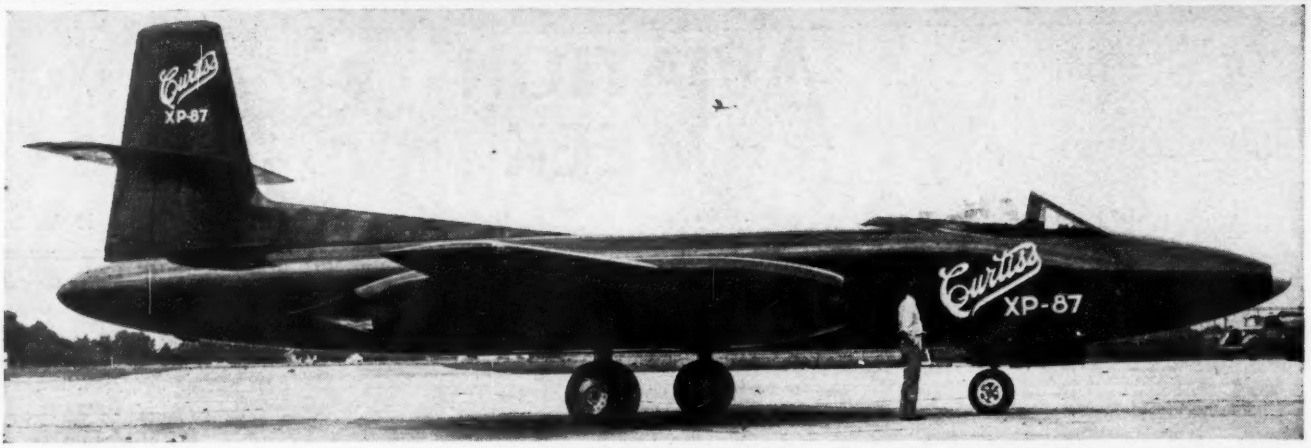
AAF Unveils New XP-87 Fighter

Army Air Forces today revealed the Curtiss-Wright XP-87 (AVIATION WEEK Sept. 1) as the first in a series of new all-weather fighters. The 620 mph. four-jet plane carries a crew of two and is designed to carry out combat interceptor or escort missions regardless of weather. Through a combination of special engineering features and radar navigational and fire control equipment, the 15-ton fighter may introduce new tactical planning factors into both offensive and defensive air combat.

With a 65-ft. span and a length of 60 ft., the XP-87 is powered by four Westinghouse 24C axial flow turbojet engines developing a total of 12,000 lb. static thrust. Decision to use these Navy-developed engines was made on the basis of their small (24 in.) diameter, enabling two of them to be installed in a thin, airfoil-shaped nacelle on either side of the fuselage. This installation provides lift over the nacelle region without the heavy drag penalties of conventional nacelle designs.

► **40,000 Ft. Ceiling**—Capable of a 620 mph. top speed, the XP-87 is rated at 585 mph. at 20,000 ft. and a rate-of-climb of more than 6,000 ft. per minute carries it up to its 40,000 ft. ceiling.

Armament is concentrated in the nose



with six fixed .50-caliber machine guns and a four-gun .50-caliber radar-controlled movable turret. The turret is controlled remotely by the radar operator but may be fired in salvo with the fixed guns by the pilot. Maneuverability has been minimized by a design factor in the XP-87 with the heavy nose concentration of fire power designed for fast passes at enemy targets.

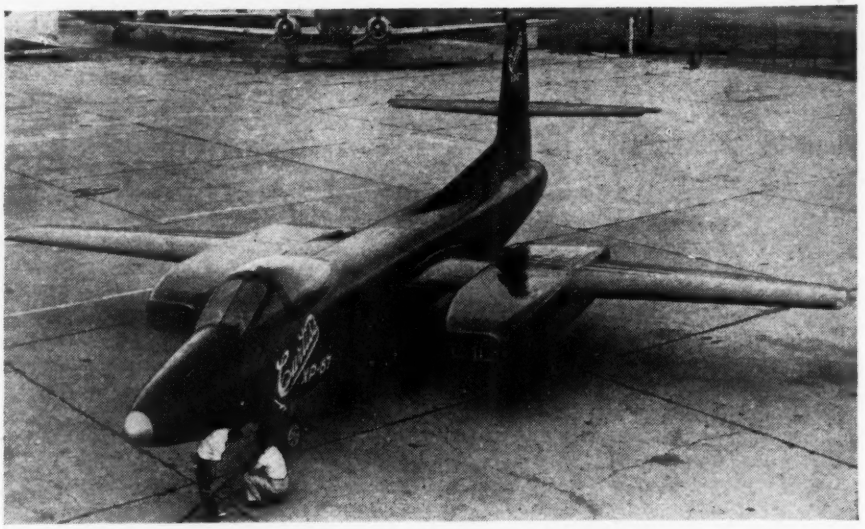
▶ **Two-Man Crew**—Two-man crew is mounted in a streamlined "bubble" cabin, which is pressurized for high altitude operation. The co-pilot/radar operator is located directly behind the pilot. Both crew members are mounted on ejection seats for high speed escape in emergency.

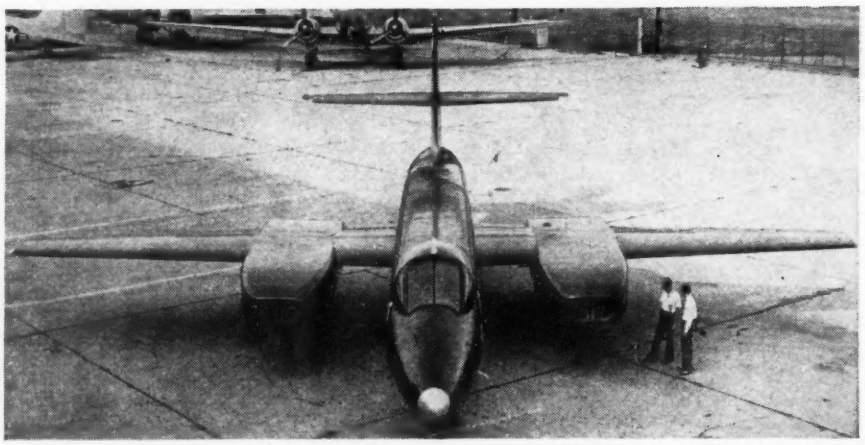
The new "all-weather" category was established by the AAF for future design purposes during the closing months of World War II on the basis of operational experience with the Northrop P-61 Black Widow and Douglas P-70 Midnight Mauler night fighters.

These multi-place aircraft, as well as converted Bristol Beaufighter and DeHavilland Mosquitos used by the AAF during the war proved the potentialities of radar-guided combat during periods of restricted visibility. Weather-grounded fighters on countless occasions throughout the war, particularly during the battle of the Ardennes Bulge pointed sharply towards "weather-proof" fighters as a tactical "must" for future design planning.

▶ **Design Requirements**—"All weather" design requires smooth cooperation between the airplane and its equipment and problems of airplane ice, gust and air intake water resistance must be closely integrated with radar navigational, gun laying and tracking equipment. Solutions to these problems in the Curtiss XP-87 will create an entirely new combat type capable of fast interception duties at night or under "zero-zero" daytime conditions. The 2,000-mile range of the new fighter could also produce an escort for strategic bombers in fulfillment of General George C. Kenney's "Aerial Coast Guard" proposal (AVIATION WEEK, Aug. 18).

Special "all-weather" features of the new category include "hot wing" deicing equipment along the wing, fin and stabilizer leading edges. This heated air from the turbojet engines is also used to clear the cabin windshield, heat and cabin and gun turret lubrication system. Special protected air intake ducts to the jet engines prevent icing or water ingestion during rain storms.

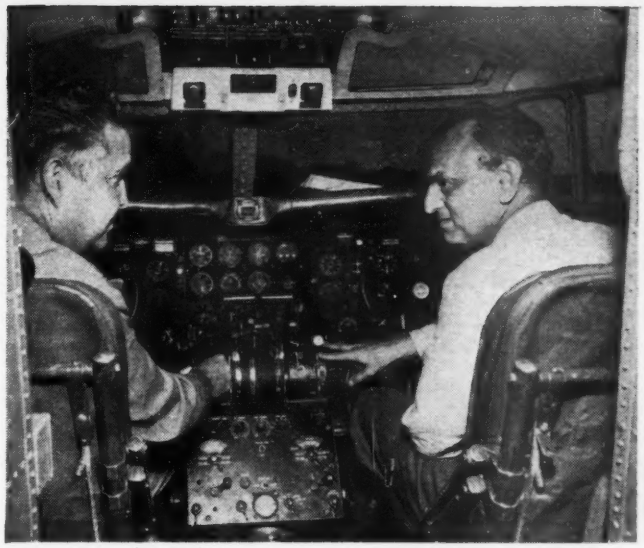


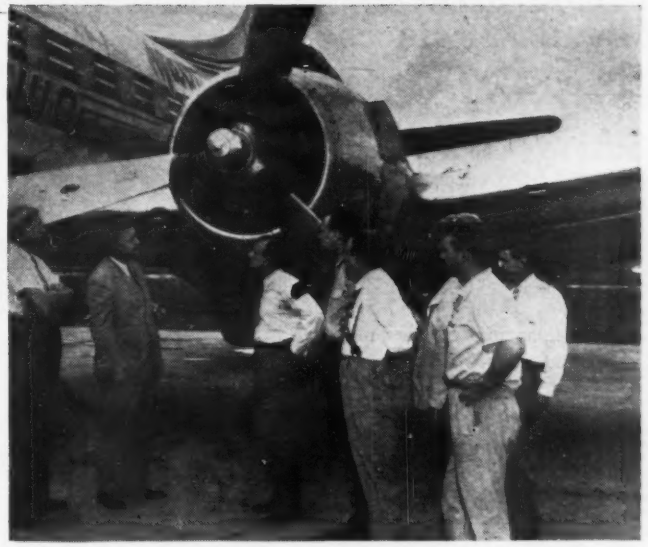


▶ **Radar Equipment**—Radar equipment includes conventional search radar with long and short range oscilloscopes, long-range navigational equipment, radar identification unit and radar gun tracking and laying equipment including automatic fire control. The laminar flow wing is a tapered, cantilever design with four small flap panels on either side of the nacelles. Slots are mounted in each wing leading edge near the tip to provide stable airflow over the aileron region at high angles of attack.

Jet nacelles are approximately 10 ft. long and are fitted with tailpipe variable thrust "plugs", which are controllable while in flight from the cockpit to vary the thrust of the engine without adversely affecting engine speed or efficiency.

Following completion of engine runup and ground tests at the Curtiss-Wright Columbus (Ohio) plant, the XP-87 will be sent to Muroc Army Air Base, Calif. for flight tests. It is scheduled to be joined there late this fall by the Northrop XP-89, second in the new series. Quantity procurement for "all-weather" fighters appears assured by the additional funds provided for the purpose in the AAF's fiscal 1948 appropriation.





LANDIS AND PILOTS INSPECT MARTIN 202

CAB Chairman James M. Landis and representatives of the Air Line Pilots Association visited the Glenn L. Martin Co. plant at Middle River, Md. for flight and ground demonstrations of the automatic propeller feathering device used on the Model 202 transport after this mechanism came up for discussion in the President's special Air Safety Board. At the left O. E. Pat Tibbs, Martin chief test pilot, explains cockpit installations to Landis. At the right Tibbs explains external features to a group including H. B. Cox, American Airlines and ALPA representative on the President's Board; J. E. Wood, Eastern Airlines and senior ALPA vice president; Larry Cates, ALPA Washington representative; Robert Hotz, Aviation Week News Editor, and Don Covington, Martin flight test engineer chief.

Safety Board, Airlines Wrestle 'Unseen Passenger' Problem

Presidential group and ICAO delegation disagree on temperature accountability as CAB postpones emergency regulation at airlines request.

By ROBERT HOTZ

The complex issue of "unseen passengers" added to gross take-off weights of airline transports by increases in air temperatures boiled to the surface of the safety situation last week. A marked difference of opinion was revealed between the President's Special Air Safety Board and the United States delegation to the ICAO Conference on Temperature Accountability in Paris Sept. 23.

The President's Board has spent most of the summer in attempting to get an emergency temperature accountability regulation into effect while the transport industry was polled for comment on a permanent regulation. Emergency regulation was finally issued by CAB to become effective Sept 6. It imposed weight penalties up to 300 lb. per degree of temperature increase above 59 degrees Fahrenheit. CAB noted that "A delay in the promulgation of this special regulation would not be in the public interest." Last week CAB postponed the regulations effective date to Oct. 15 after Air Transport Association protested that airlines would be unable to have new take-off weight calculations ready to meet the Sept. 6 deadline.

► **ICAO Delegation**—Meanwhile the U. S. delegation to the ICAO Paris Conference on Temperature Accountability adopted a position that differs materially from the President's Air Safety Board recommendations. The ICAO delegation will plump for full temperature accountability based on the monthly average temperature at each specific airport with a spread of plus or minus 20 degrees Fahrenheit.

The Air Line Pilots Association, which has been spearheading adoption of the emergency temperature regulation through its representation on the President's Board assailed the ICAO delegation's decision on the grounds that no airline pilots were included in the delegation or in meetings which led to the delegation's decision. They pointed out that the delegation included two representatives of the Air Transport Association and Aircraft Industries Association, whose expenses to Paris are being paid by the State Department. AIA representatives, Phillip Coleman of Lockheed and W. B. Oswald of Douglas, opposed temperature accountability at the Presidential Board public hearings on the subject. ALPA indicated it would take its plea for representation on the ICAO delegation to CAB and Presidential Board Chairman James M. Landis.

► **Sharp Disagreement**—ATA and ALPA were also in sharp disagreement on the result of the emergency temperature regulation on foreign operations of U. S. carriers. ATA claimed that operations of Pan American, Chicago & Southern and National Airlines would be hampered at Havana because of 4,000 ft. runways at the field now used. ALPA pointed out that a surplus military airport with three 7,000 ft. runways was located a short distance from Havana and suggested a shift to the larger field.

ATA board of directors devoted the majority of its last meeting to economic effects of temperature accountability and estimated that revenue losses due to decreased payloads are apt to be severe particularly during the peak traffic of the summer season.

Meanwhile the President's special Air Safety Board turned its attention to how the two latest airline transports, the Martin 202 and the Convair Liner meet safety requirements of the transport category. Pilots representatives were particularly concerned about the use of the automatic propeller feathering devices on both planes to increase gross take-off weights, and heavy loading doors in the forward part of the cabin.

With CAB Chairman Landis, ALPA representatives participated in flight and ground demonstrations of the Martin automatic propeller feathering device. Main purpose of the device is to reduce time a propeller windmills during the feathering process thus reducing drag and allowing better climb characteristics.

Without automatic feathering the Martin 202 is certificated for a 34,500 lb. gross weight. With the device CAA allows a 38,000 lb. gross. Convair Liner which faces the same problem is still undergoing certification tests. Pilots indicated they are not happy about taking on an additional 3,500 lb. take-off weight on the sole strength of the feathering device.

Miami Air Races Scheduled For January

First steps toward a permanent organization of the Miami All American Air Maneuvers are being taken this year in the form of foundation memberships being offered to business and professional firms and individuals at $150 each. These funds will be augmented by appropriations of political subdivisions of the great Miami area. Previously, financing of the maneuvers has been by allotments of publicity funds from city and county treasurers in the area.

An added feature of the 16th annual maneuvers to be held Jan. 9, 10 and 11, 1948, is a trophy race for plane with 190 cu. in. displacement engines under the rules of the Professional Race Pilots Association, which governed the highly successful Goodyear Trophy Race at the National Air Races this year. Other events will be P-51, P-38 and P-63 daily races seven laps over a 15-mile course and a free-for-all race 12 laps over the same course. In addition, Army and Navy, aerobatics and special acts will be displayed.

New 'Copter Uses Tested in California

Helicopter utility has blossomed on two new fronts in Southern California due to the imaginative planning of Knute Flint, president of Armstrong-Flint Helicopter Co.

His experimental shooting of motion picture "chase" sequences, pursuing fleeing bandits on foot and in cars with a camera mounted in a Bell Helicopter, brought an R. K. O. Studios contract. Costly longdolly and camera boom setups were abandoned and the helicopter camera used in filming "Your Red Wagon". Twelve of a series of sequences quickly shot in ten hours of flying will be used in the finished film. Studio producers estimated they had saved $10,000 in production time and equipment setups.

More dramatic are results of helicopter flying in the recent forest fire that swept a rugged mountain section near Los Angeles. Two Armstrong-Flint helicopters flew a total of 64 hr. in five days, rescued a total of 20 trapped fire fighters, transported 250 to fire fronts having no road access, and delivered an average of one ton of supplies a day to fire fighters....food, water, tools and bedding. Landings were made at altitudes as high as 6500 ft.

A DC-3 contractor at one time parachuted 1154 lbs. of supplies to fire fighters, with varying accuracy, at a cost of $145. Flint estimated his cost to the forest service for delivery of a similar volume to have been $70, with the supplies spot-landed where needed and with no loss of time for special packaging required for parachuting supplies to the ground.

Flint's company now is experimenting with helicopter walnut harvesting, using rotor blast to strip nuts from trees. Conventional harvest technique is for workers to shake the trees, by hand and mechanically, which frequently damages the trees.

BUILDS 1916 VINTAGE PUSHER

When nostalgia for the "good old days" got the best of Airline Pilot Walter Bullock of Lakeville, Minn., he and his wife built this replica of the pusher plane he flew in 1916. Bullock says the plane requires constant maneuvering to keep it aloft and has the gliding characteristic of a rock. It cruises at 55 mph. and with 25 gal. of gas can stay in the air five hours. (World Wide photo)

Air Policy Group Swings Into Action

Efforts to iron out a national air policy will move into high gear this week as the Congressional Air Policy Board holds its organizational meeting today, and the President's Air Policy Commission begins open hearings.

The President's group, headed by Thomas K. Finletter, began hearings last week with closed sessions considering testimony presented by key Government aviation officials. Beginning today, with Admiral E. S. Land, president of Air Transport Association leading off, industry will present its views.

Although Sen. Owen Brewster (R., Me.) presumably is in line for the chairmanship of the Congressional board, with Rep. Carl Hinshaw (R., Calif.) as vice chairman, there was some feeling last week that Hinshaw might get the top spot.

Brewster's not-too inspiring role in the recent Hughes investigation may weigh against him. Possibly a more important consideration is that the Maine Republican is firmly committed to the chosen instrument policy of international transport operations, and committee members feel that as chairman he might let that theme dominate the deliberations.

Secretary of Commerce Harriman was the first witness at the Finletter Commission's initial closed hearing. He was followed by Garrison Norton, chairman of the Air Coordinating Committee; William C. Foster, Undersecretary of Commerce; CAB Chairman James Landis; James Webb, Director of the Budget; John Nicholas Brown, assistant Secretary of Navy for Air; and W. Stuart Symington, assistant Secretary of War for Air.

AFA to Meet

Air Force Association will hold its first convention Sept. 15-16 in Columbus, Ohio. Boasting 111,208 paid members, the AAF alumni association now has 145 squadrons throughout the country. Adoption of a 1948 program, election of officers and orientation on National Guard reserve and regular Air Force problems will dominate the program. Speakers include: W. Stuart Symington, Secretary of the Air Force; General Carl Spaatz, USAF commander; Gens. George Kenney, Curtis Lemay and George Stratemeyer and AFA president James H. Doolittle.

Bellanca Aircraft Resumes Work as Strike Settled

Workers of the Bellanca Aircraft Corp. at New Castle, Del., have ended the labor dispute which had been in progress since July 15 by ratifying an agreement reached earlier by negotiators for the company and Local 840, United Auto Workers, CIO.

The Bellanca Corp. is preparing to resume operations this week following settlement of the nearly two months old dispute. About 100 workers are employed in the plant.

The new agreement includes the union shop. Other terms include: seniority by occupational family groups; a revised vacation plan; simplified grievance procedure; a no-strike pledge on the part of the union and a guarantee on the part of the company against suits or other proceedings under the Taft-Hartley Labor Act.

Racing Pilots Ask For New Rule Changes

Aftermath of the National Air Races at Cleveland during Labor Day weekend indicates major revisions in racing rules next year as a result of the terrific pace of this year's contests that resulted in one fatality and four crack-ups in the Thompson Trophy Race alone.

Meeting after the races the National Professional Racing Pilots Association came up with the following recommendations that will be considered at a meeting of National Air Race and National Aeronautic Association officials in Washington early next year:

- **Cut the Thompson Trophy** field from 12 to 10 planes thus eliminating the dangerous free-for-all around the first pylon.
- **Limitations on Degree** to which standard engines can be souped up for the speed events. At least three engines failed during the Thompson race in an effort to get too much power from them.
- **Improved Methods** of signalling pilots during the races and addition of flash reflectors to pylons making them more easily visible from the air. Many pilots reported that they were unable to see the checkered flag signals from the ground and had difficulty locating pylons in ground haze.
- **Earlier Qualifying Trials** and impounding of qualified planes between qualification runs and final race time.

Criticism of the lower echelon race management ground personnel by the pilots was particularly bitter. Pilots feel that the pre-war race personnel are unable to handle the race-horse starts of military type planes. Specifically, they blame the ground handlers for allowing a 13th plane to get off the ground into the 12 plane Thompson Trophy Race.

Cook Cleland, Thompson Trophy winner, and owner of the Goodyear Corsair in which Anthony Janazzo was killed, disclosed that both his other Corsairs lost exhaust stacks during the race leading him to believe that Janazzo's death was caused by carbon monoxide poisoning resulting from loss of an exhaust stack too close to the engine cylinders. William Eddy was dragged from his P-51 cockpit to the hospital after finishing the Bendix Race with a severe case of carbon monoxide poisoning.

AVIATION CALENDAR

Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.
Sept. 16—International Air Transport Association, technical committee, Nice.
Sept. 16-18—Second Regional CAA conference, Atlanta.
Sept. 17 — ICAO meteorological division Montreal.
Sept. 17—SAE metropolitan section (N.Y.) Navy research inspection tour (Sands Point Lab, Long Island) and symposium (Hotel Pennsylvania, N.Y.C.) on training devices and instrumentation.
Sept. 23—ICAO aerodromes, air routes and ground aids division, Montreal.
Sept. 23—ICAO joint air/ops committee meeting, Paris.
Sept. 23-25—AIEE middle eastern district meeting, Dayton, Ohio.

INDUSTRY OBSERVER

► **AAF is considering an order for 15 Northrop Pioneers, tri-motor transport, for use as ATC rescue planes in the Arctic. Another order for 40 Pioneers from TACA hinges on CAB approval of Waterman Steamship Co. purchase of majority interest in TACA from TWA.**

► Official mach number calculations for the Navy's two record-breaking runs in the Douglas D-558 credit Comdr. Turner Caldwell with reaching mach .828 while averaging 640 mph. and Marine Major Marion Carl with mach .831 when he averaged 650 mph.

► **McDonnell Aircraft Co. now has a backlog of about $36,000,000, largely military business. Company's Navy designation has been changed from D to H because of conflict with Douglas. The Banshee is now designated the XF2H-1.**

► Ground tests on Beech's model 34 feederliner transport have been delayed because of difficulty in obtaining engines. Beech plans to make tests with both Lycoming and Continental engines.

► **First Cessna model 170, four place, high-wing, all metal personal plane, is expected to be finished this month. Cessna hopes to market it in the $5,000 class.**

► Rawdon Bros. have received a CAA approved type certificate for their wartime developed T-1, a tandem, low wing personal plane.

► **Sperry Gyroscope Co. has started quantity production on its new electronic analyzer for aircraft power plants, which locates and analyzes engine troubles during flight.**

► Convair liners will be equipped with safe flight indicators, a 7 oz. stall warning indicator manufactured by the Safe Flight Instrument Corp., White Plains, N. Y.

► **Navy interest in turboprop units is increasing as evidenced by new Bureau of Aeronautics research and development contracts for gas turbine propeller projects. Navy borrowed AAF General Electric TG-100 unit for Ryan XF2R-1 flight tests. Now Navy turboprop contractors include Pratt & Whitney, Chrysler, Allison, Ranger and DeLaval. All except Ranger also have AAF development contracts for turboprop units.**

► Second Lockheed Constitution is now nearing completion. It is being fitted out with litter equipment for use as an air evacuation and hospital plane. It is scheduled to go directly into Naval Air Transport Service. First airplane will continue as test ship.

► **Beech has signed a contract for the delivery of three model D-18S twin-engine light transports to the Portuguese Navy. Two of the planes will be standard passenger versions with the third equipped as a special high-altitude photographic plane. Beech also delivered three D-18C's to the Argentine Navy.**

► First combat aircraft "De-mothing" operation is now under way at Tinker Army Air Base, Okla., where 100 Boeing B-29's are being taken out of storage status and modified for active service.

► **Winning pilots in the National Air Races at Cleveland who used Kendall Oil in their planes received a bonus amounting to 10 percent of their winnings from the Kendall Oil Co. Thompson Trophy winner Cook Cleland got an extra $1,950 from Kendall.**

► Cleland plans to ignore all barnstorming offers to concentrate on his fixed base operations at the East Euclid Ave. Airport, Willoughby, Ohio, but will enter his two remaining Goodyear Corsairs in the Thompson race next year.

► **Look for a boost in Goodyear Trophy prize money from this year's $25,000 that may make it the most profitable event on the program for pilots in view of the low cost of the light-plane racers involved. Course will also be changed so that the entire race will be visible from the grandstand.**

► Final count on the 1947 National Air Races indicated a $25,000 deficit on two day total attendance of $171,000 with the third day's program washed out by heavy thunderstorms.

► **War Assets Administration is studying possibilities of enabling its aircraft parts and components agents to widen their export sales in anticipation of dwindling domestic markets.**

EFFECT OF TAX CARRYBACK CREDITS

Representative Aircraft Companies

(For six months ended June 30, 1947)

	Net Loss Prior To Tax Credit	Tax Credits	Net Loss
Beech	$4,366,135	$2,803,805	$1,562,350
Bell	735,934	525,000	210,934
Boeing	5,720	70,000	†64,280
Consol-Vultee*	2,478,033	1,708,260	769,827
Curtiss-Wright	5,241,837	5,000,000	241,837
Douglas*	6,612,307	5,960,000	752,307
Republic**	2,134,220	1,598,000	536,200

Notes: † Profit. * Six months ended May 31. ** Three months ended March 31.

Tax Carryback Credits Are Aids To Many Aircraft Manufacturers

Deficits are smaller; profits have been converted from losses; heavy development expenditures have been financed in this manner.

Tax carryback credits continue to aid many aircraft companies. The industry is one of the few in a position to use such carryback adjustments during 1947 with respect to unused excess profits tax credits of previous years.

Without such tax credits, deficits from current operations in many instances would be much larger than reported. In a few, nominal profits have been converted from large losses thru the tax credit device. For the most part, heavy development and experimental expenditures have been financed in this manner. For example, North American Aviation reported a net profit of $303,487 for the nine months ended June 30, 1947. This was after application of a tax carryback credit of $4,260,500 and greatly facilitated the company's ability to absorb the $8,000,000 loss in discontinuing the Navion program.

▶ **Carryback Prominent**—Tax carryback credits played a prominent part in 1946 results for the aircraft industry, minimizing many deficit operations. Contrary to popular belief, such relief did not come to an end with the closing of the 1946 year. Under Section 722 of the Internal Revenue Code, it remains possible for companies to continue to offset current losses with unused excess profits tax credits of prior periods.

This tax credit device has been particularly helpful to those companies having a broad tax base, generally established in prewar years. This took one of two forms, either the capital investment was large or a high level of earnings was previously recorded. This circumstance eliminated a number of aircraft companies from obtaining the full benefits of the tax carryback provisions. The early history of most aircraft units was devoid of sustained earnings and not all were able to show a large enough capital base.

▶ **Grumman Writes Off**—Grumman Aircraft & Engineering, unlike some, without benefit of tax credits was able to make substantial write-offs last year and still report a profit. The company charged $1,603,013 as the tooling and development expense on its Mallard program and was still able to show a net income of $337,771 last year.

The accompanying table illustrates the effect of carryback tax credits during the first six months of this year. The amount of relief obtained in this manner is indeed substantial and has the very important advantage of husbanding cash resources. It is to be expected that such tax credits will continue to be operative during the remaining periods of this year and must be considered in any projection of aircraft earnings.

As shown in the table, Boeing applied a very nominal tax credit, only $70,000 which resulted in a net profit of $64,280 for the first half of 1947. However, during 1946 the company utilized a tax credit of $4,726,126 which more than offset the development expense of a discontinued project, $2,189,016 as well as covering $1,390,635 representing previous years income tax liability.

▶ **Credits Determined**—In a number of cases, tax credits and liabilities remain to be determined. United Aircraft Corp. provides an outstanding example in this respect. During 1946, this company used tax credits totaling more than $12.5 million which facilitated a net income of $6,060,750 for the year. For the six months ended June 30, 1947, the company reported a net income of $3,416,873 without benefit of any tax credits. However, in a footnote to its recent financial statement, United Aircraft reports that in 1947 it filed claims for tentative carryback adjustments with respect to the unused excess profits tax credits and the net operating loss for the year 1946, and the amount collected therefrom exceeded by $1,103,000 the amount previously recorded in the accounts for 1946. Further, the company filed claims in the amount of $1,339,674 for federal income and excess profits tax credits applicable to prior years which resulted from the reallocation of amortization of emergency plant facilities to the shortened emergency period.

▶ **United Gets Capital**—Early in the war period, United Aircraft Corp. sold some $26 million in preferred stock. The purpose was to broaden the company's tax base and provide additional working capital as needed. When these securities were marketed the inference was made that at the end of the war, they would be retired as they will have had served their purpose. However, no such course was followed. Instead of calling in the preferred stock and reducing the capitalization in the process, the company has added to its capital structure. The company recently arranged for a three year line of bank credit to the extent of $25 million. This credit is to assist the company in financing the acquisition of various government plant properties. As of June 30, 1947, $15 million of this bank credit had been drawn down.

Nevertheless, the company remains in a very healthy financial position despite its borrowings. After paying the government $10,150,000 on June 30 for various plant properties, United Aircraft showed cash and marketable securities of more than $77 million. Since June 30, the company paid the balance of $9,850,000 due for the government properties acquired. However, the management reports that large sums of money will be required for the turbine laboratory now under construction.

▶ **Credits Beneficial**—There is little doubt that the tax carryback credits have developed to be one of the most beneficial devices assisting many aircraft companies through a difficult period. It has provided support to limited development programs which may be expected to find reflection in future periods.

—Selig Altschul

LETTERS

NOTAM Spoiled?

To the Editor:

I have received the first copy of the revised Weekly Notice to Airmen. I have always considered it as one of the most important publications to private and commercial pilots. Now in its new form it is of little value.

In the mails this week I also received from CAA the following books:

A Laboratory Study of Soil Stabilizing Effectiveness of Artificial Resins With Special Emphasis on Aniline-Furfural Resins.

Location of Underground Cable Failures.

Development of Flight Level Indicator.

An Investigation of Sight Requirements for VHF Radio Ranges.

Development of the Ultra-High-Frequency Radio Range, Part 3.

An Automatic Monitor System for Radio Ranges.

Theoretical Considerations of Ultra-High-Frequency Simultaneous Radio Ranges.

Flight Test of the United Air Lines Warning System.

Measurements of Noise Radiation from High Voltage Transmission Lines.

Would it not be better to use these funds for the safety of all pilots in a more concrete way if the CAA is so short of funds?

I am a firm believer in research and technical developments but I think that the flying public should know how the money allotted to CAA is being spent.

I sincerely hope that CAA will see fit to reconsider their action on the Weekly Notice to Airmen and believe they will if enough pilots request it.

W. S. Law, Manager
Fayetteville Air Service
Fayetteville, N. C.

Baggage Racket

To the Editor:

Here is a story for Aviation Week, but I must be an anonymous informant.

When I checked in at LaGuardia Field I had baggage weighing about 110 lb. My memory is that each trans-Atlantic passenger is allowed a maximum of 66 lb. and is charged 1 percent of the one-way fare for each kilo excess. I figured that I would have to pay about $70 extra.

The colored porter who grabbed the bags told me that I was "way overweight," but that he could save me a lot of money. He put them on the scale and said that, as I thought the extra would come to $70, and added that half of that amount to him would take care of the problem. Now, I'll fight anybody who challenges my integrity in personal transactions, but in business I'll operate in the most profitable way if I suspect that everybody in the situation is operating in the same way. So I paid the porter only $35 of the company's $70 that TWA should have received.

Later, on the plane, a girl, formerly with Time, told me that she had accepted the same proposition, but I don't know the amounts involved in her case. I am sure that everybody on the plane had done the same thing.

And I feel confident that the airline ticket people behind the counter, who let the porter do the weighing and accepted his figure of a total of 65 lb. for what any fool could have seen was a vastly heavier aggregation of luggage, are in on this profitable racket.

So what? So the airlines are being cheated out of revenue and their rules (or CAB's?) are being violated. So, if a 66 lb. weight-limitation is out of date, as I think it is now that they have big planes and want the patronage of well-laden tourists, they should get it cut out, instead of allowing it to fester in this way. So, the planes are taking off with a greater load than is shown on the books. And the fact, if not the amount, is no joke in view of the "overload" talk in connection with recent takeoff crashes. Constellations carry 40 passengers and 40 of me would have added over 1,600 lb. that were never reported. Finally, none of us 40 likes to be involved in rackets just because we think we ought to save money for our employers.

LaGuardia leaves a bad taste in my mouth. Air France at LeBourget charged me $10 for the excess on the Paris-Frankfurt trip with no monkey business.

Tourist
Berlin, Germany

BOAC Mileage

To the Editor:

With reference to an article which appeared in your Aug. 4 issue, giving certain statistics regarding airlines, you may be interested in the following comment that has appeared in the BOAC Reference Bulletin from London. It reads:

"Corporation records do not confirm these figures for BOAC route and aircraft mileages. At Apr. 1 our unduplicated route mileage was approximately 71,700 (which would give us by far the 'largest active route system in the world'). It is not clear on what calculation the Aviation Week figure of 45,846 miles can be based, though it is possible that the large difference between this and the actual figure of 71.700 may be because the American magazine calculated only one route between terminals where we were operating more than one service with different aircraft on different tracks (e.g., UK-Sydney by Lancastrian and by Hythe). As regards the figure of '409,048 plane miles weekly,' our records show a weekly average for scheduled services at Apr. 1 of about 510,000 miles."

G. A. W. Wynne,
Public Relations
Atlantic Division, BOAC

(*Editor's Note*—The figures were compiled by the Economic Bureau of the CAB.

Taxpayer Protests

To the Editor:

In your Aug. 18 issue there is an article . . . which impresses me as being purely political and does not seem in tune with the flavor of McGraw-Hill publications. It has to do with an economy move which hit the CAA Airman's Guide.

I am a taxpayer as well as pilot. I have no idea how many federal taxpayers there are . . . but am told there are over 60 million employed people . . . So for the benefit of 21,000 subscribers to CAA Airman's Guide 60 million people have to "kick in". It appears to me as being just that if these 21,000 pilots want the information given in the Guide they should be willing to pay for it themselves in its entirety rather than have it subsidized.

It has also occurred to me that this information might be published commercially and furnish someone, or some group . . . with gainful employment and so take the government clear out of this much of the publishing business . . .

If we ever get this country straightened out economically, it seems to me that encouragement of subsidies will have to diminish and more people will have to pay their own way. . .

C. M. Loomis
Fairchild Engine & Airplane Corp.
Winfield, Kan.

Power Controls

To the Editor:

Just to prove I read every word of every issue of Aviation Week, I call your attention to Industry Observer Aug. 18, mentioning the Hughes power control system as the first use of power as the sole operating method.

Let me remind you of the Northrop N9M flying wings, which were flown early in the war and are still being used, and the Northrop XB-35, first flown in June, 1946. Both these airplanes used power control systems which were not, as you put it, "power boost," but in which the pilot's strength only operated a valve which in turn moved the control surfaces.

Al Cline
Director of Public Relations
Northrop Aircraft, Inc.

Atlas Corp. Acquires Control Of Convair; Howard Key Figure

Avco Manufacturing Corp. relinquishes Aviation holdings in deal with Odlum firm; observers expect new board will be closer attuned to aviation.

By WILLIAM KROGER

Sweeping executive changes are in prospect for Consolidated Vultee Aircraft Corp. following decision by Avco Manufacturing Corp. to relinquish control in a complicated stock deal which also will take Convair out of the non-aviation business and put Floyd Odlum's Atlas Corp. in control of the Convair group.

Irving Babcock and Harry Woodhead, chairman of the board and president, respectively, of Convair are expected to resign along with at least seven other members of the board who have represented Avco.

▶ **Howard Key Figure**—Key figure in the new set-up, it is foreseen, will be Ben Howard, recently assistant to Donald Douglas, who has joined Atlas Corp. as "specialist in the aviation field." Howard will be on the new Convair board and may assume a vice-presidency. Howard, onetime race pilot and designer and manufacturer of private planes, is expected to have an influential voice in selection of the new Convair president. Odlum presumably will take over the Convair chairmanship.

Another almost certain selection for the board is Jacqueline Cochran Odlum, veteran pilot and wife of the Atlas Corp. president.

Avco's divestment of Convair is not unexpected. Since the end of the war, Victor Emanuel, Avco's chairman, has been anxious to take his company out of the aircraft business and concentrate on the ground transportation and consumer goods fields. A year ago, a proposed Convair merger with Lockheed bogged down in the late stages of negotiation.

▶ **New Control**—In line with Emanuel's long-held desires, Avco will now control a new corporation which will take over Convair's Nashville division (manufacturing kitchen and home appliances) and ACF-Brill Motors Co. (of which Convair owns 48 percent) and its wholly-owned subsidiary Hall-Scott Motor Car Co.

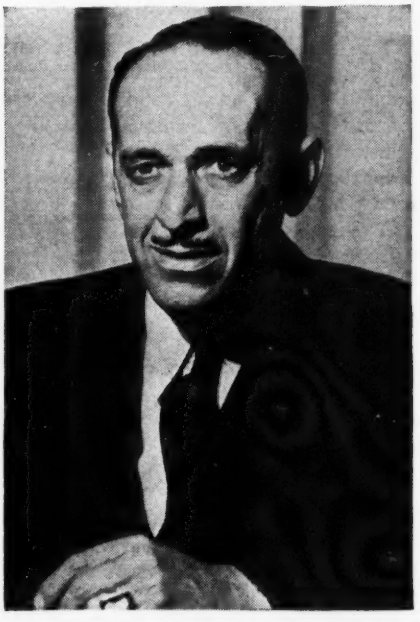
From a financial razzle-dazzle will come a Consolidated Vultee Aircraft Corp. stripped of non-aviation interests, with an increment of about $6,000,000 in cash, roughly one-fourth less stock outstanding, and with Atlas Corp. in a position to exercise much more control than Avco did.

Both boards of directors have already approved the plan. If Convair stockholders, at a special meeting Nov. 3, approve it, what will happen is this:

• **Convair Sells Subsidiaries**—Convair will sell its Nashville division and ACF-Brill to its present stockholders. For each four shares a stockholder owns, he will surrender to Convair one share plus $18.50. For this one share and the cash he will receive two shares in the new corporation which will take over the Nashville operation and ACF-Brill.

Convair has outstanding approximately 1,570,000 shares. If all present stockholders participate, Convair will get back approximately one-fourth of these shares, or close to 400,000 shares. In addition, it will receive $18.50 with each share turned in, or upward of $6,000,000.

• **Stock Holdings**—Avco owns about 400,000 shares of Convair or approximately 25 percent. It will turn in 100,000 shares and take 200,000 in the new company, which will constitute nearly 50 percent ownership. Avco is then expected to sell its remaining 300,000 shares in Convair to Atlas Corp.



Ben Howard, recently assistant to Donald Douglas, will be on the new Convair board and may assume a vice presidency.

Atlas now owns about 100,000 shares in Convair, or more than 6 percent. It will pick up an additional 300,000 shares, but because Convair's outstanding stock will be reduced, Atlas' 400,000 shares will have greater voting power than did the original Avco stock.

The net effect, actually, will be to transfer ownership of Convair from one well-financed holding company to another. An additional effect will be to put in the Convair driving seat a man with an active interest in aviation (Odlum) in place of one who has taken a dim view of aircraft manufacturing (Emanuel).

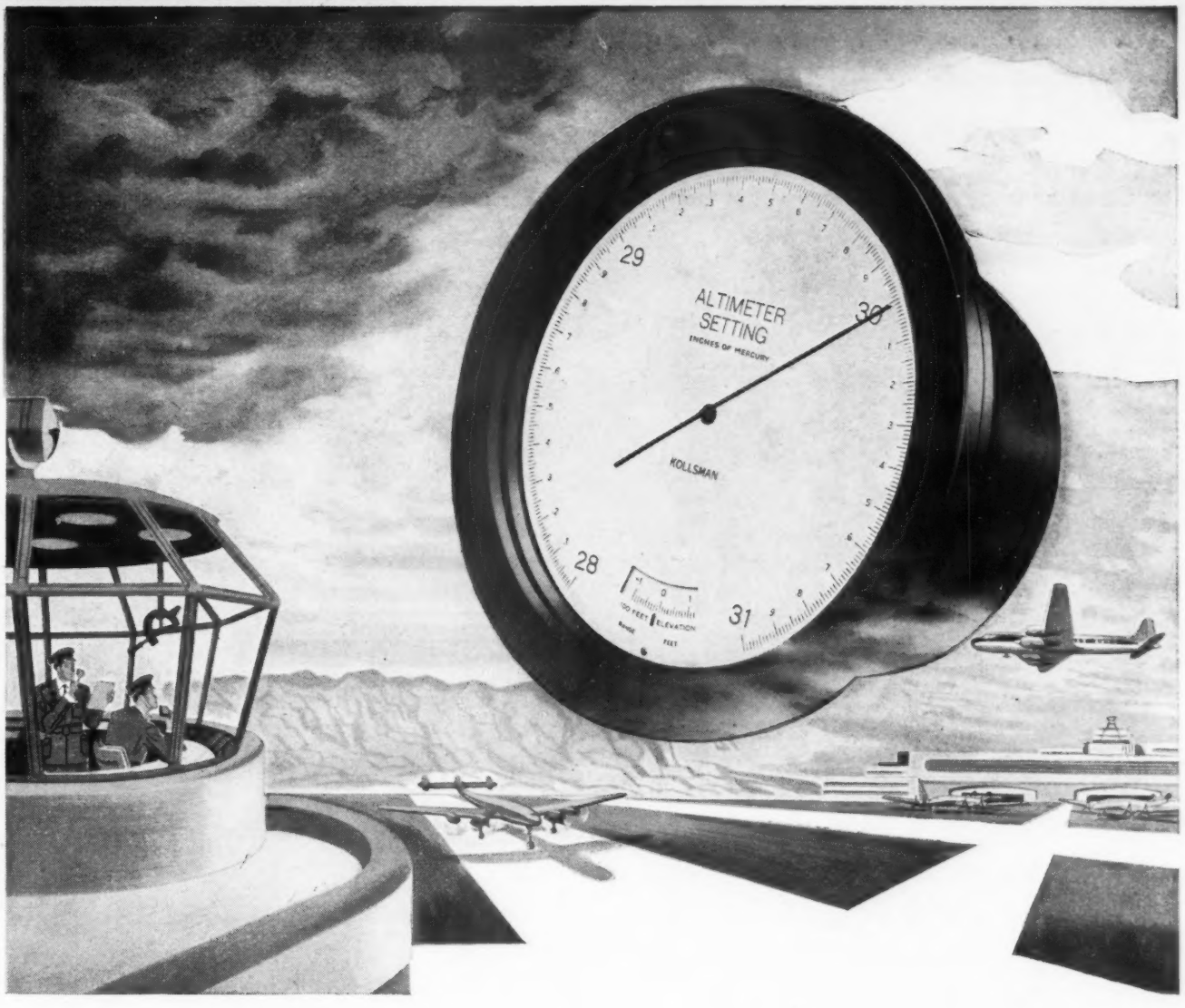
▶ **Changes Anticipated**—It is too early to anticipate any change in Convair manufacturing policy. The development that is being awaited by observers is selection of the new Convair board. It may, overall, be closer attuned to aviation than is the existing board, heavily sprinkled with men whose backgrounds are more in automotive fields.

Odlum's interest in Convair may mean a new interlocking directorate case for CAB. Atlas Corp. is the largest single stockholder in Northeast Airlines which recently has been dickering for Convair liners. At the time Avco controlled American Airlines the carrier contracted for 100 of these planes, and CAB later ordered Avco to divest itself of control of the airline.

Lightplane Figures Revised

Due to typographical errors, some of the lightplane shipment figures in the Production Progress Report for the first six months of this year (AVIATION WEEK, Sept. 1), were shown incorrectly. Shipments of 2-place planes for January were 969 instead of 960, and for March were 789 instead of 780. Total 2-place shipments for the six months was as shown, 4,952.

Total 3- and 4-place shipments for the six months was 5,642, instead of 5,592.



Another step towards greater airline safety

The new Kollsman Altimeter Setting Indicator for airway control stations provides a direct, continuous, accurate indication of the altimeter setting for broadcast to the aircraft. By eliminating potential sources of error and delay present in existing methods, the Altimeter Setting Indicator offers another step towards greater airline safety. By its greater accuracy it also makes possible more accurate indication by the altimeters in the aircraft — an important consideration in steps towards all-weather flight.

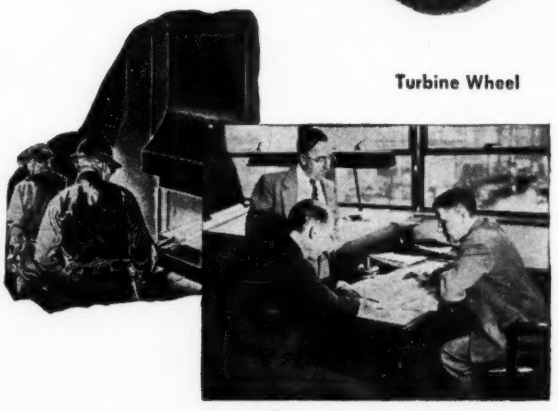
KOLLSMAN AIRCRAFT INSTRUMENTS

PRODUCT OF

SQUARE D COMPANY

ELMHURST, NEW YORK · GLENDALE, CALIFORNIA

STEEL IMPROVEMENT
FORGED TURBINE BLADES
ARE ALWAYS
Dependable



Turbine Wheel

The forging of turbine blades, buckets and wheels for gas turbine engines requires the employment of correct techniques for forging high temperature alloys to close tolerances. Long experience in forging intricate designs, plus specialized metallurgical and engineering skill, equip Steel Improvement Forging Engineers and Metallurgists to: (1) know the exact forging technique that should be utilized for developing fully the qualities, inherent in the alloy, that are required to meet the high stresses occurring in modern aircraft engines; (2) avoid costly experimentation in forging and heat treating blades, buckets and wheels; (3) advise and assist designers regarding the correct placement of parting lines and other design elements; and (4) adhere strictly to a policy of projecting a promise only when the accomplishment of the work can be substantiated by fact or experience or both. Consult a Steel Improvement Forging Engineer concerning "The Improvement of Metals by Forging."

Backed by over 33 years of forging production experience, Steel Improvement Engineers and Metallurgists have under their direction complete facilities for performing the highly specialized work of forging and heat treating turbine blades, buckets and wheels of high temperature alloys. *These facilities constitute a Turbine Forgings Division, the authority and responsibility of which encompasses all required phases of engineering, metallurgy, production and inspection to assure you dependable forgings.*

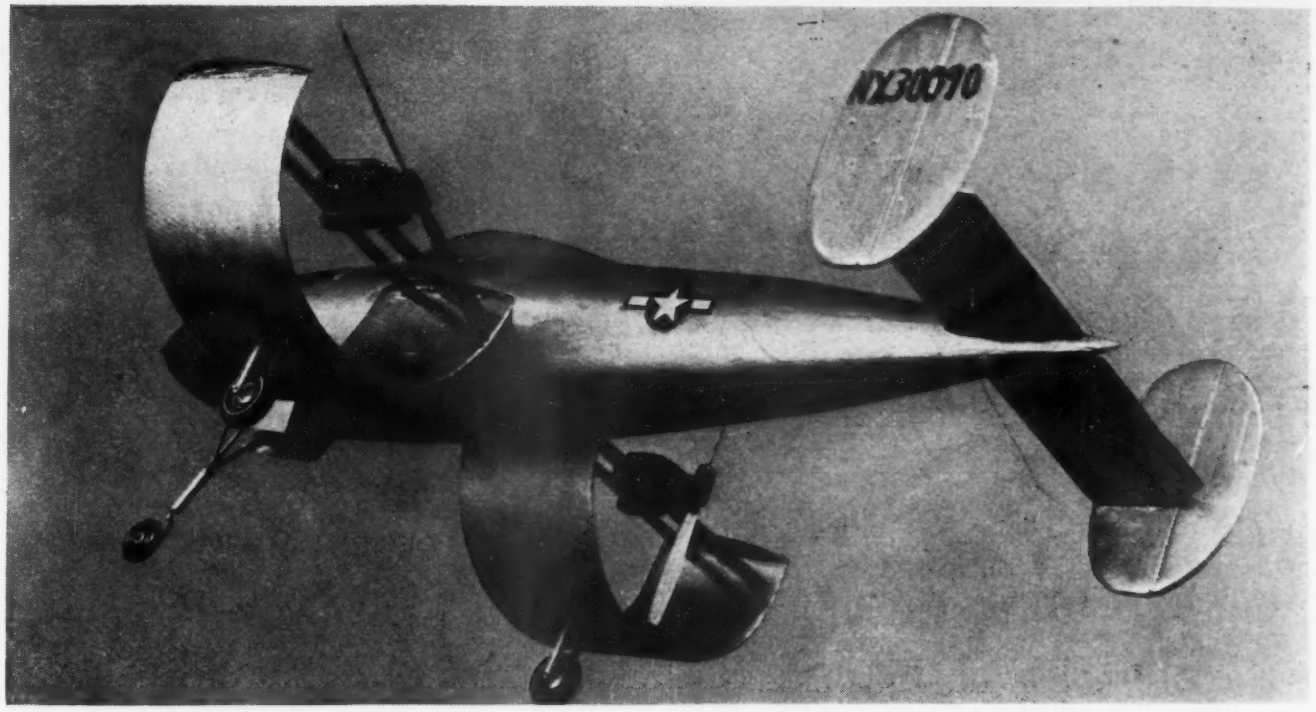
Turbine Forgings Division

DROP FORGINGS

THE STEEL IMPROVEMENT & FORGE CO.

975 East 64th Street CLEVELAND, OHIO

SALES OFFICES: NEW YORK • CHICAGO • MILWAUKEE • TULSA • LOS ANGELES



Rear view of first flying channel wing airplane.

New Channel Wing Nears Flight

Higher efficiency attained after tunnel tests are evaluated. Inventor sees competition with helicopters.

Willard R. Custer, Hagerstown inventor has advised AVIATION WEEK that his second Channel Wing airplane is expected to fly at Hagerstown, Md., in late October or early November.

Custer and some fellow townsmen have organized the National Aircraft Corp., to back the unconventional aircraft, and are confident of success believing that eventually a very large percentage of all fixed wing aircraft will use channel wings.

Their confidence is based on:

100 hr. of successful flights already made with the first channel wing airplane in 1943-44 at Beltsville, Md. (*Aviation News*, June 2, 1947.)

Wind tunnel tests made in the spring of 1946 at Wright Field, and AAF Technical Report No. 5568.

▶ **Engineer Satisfied**—Don Young, Wright Field engineer, was called as a witness in Custer's recent Federal District Court case in Washington on channel wing patents, and testified that in his opinion, based on wind tunnel tests, the channel wing was capable of direct lift. (Patent case concluded with court order to U. S. Patent Commissioner Casper Ooms, to allow four additional Custer patent claims.)

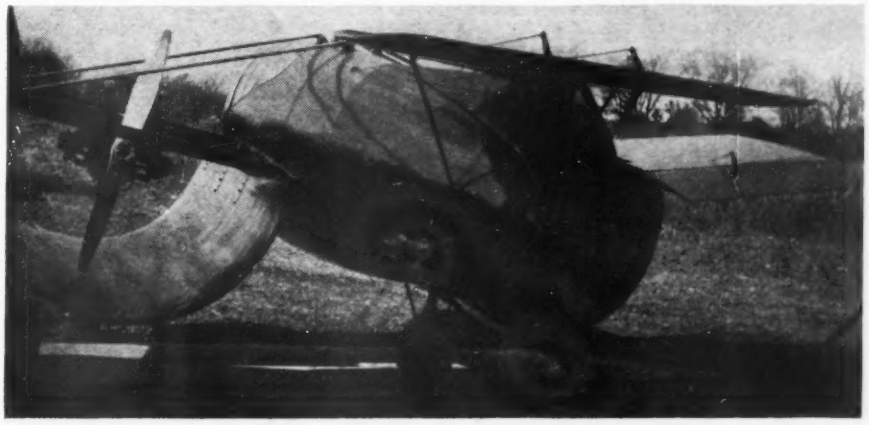
At Custer's Hagerstown workshop recently, two representatives of AVIATION WEEK, Alexander McSurely and Hal McFarland (special correspondent), inspected the original channel wing which flew at Beltsville, discussed the flights with the inventor, and saw motion pictures of the first test flights which fully corroborated the inventor's story.

▶ **Pilots Skeptical**—Custer said first plane used auxiliary conventional wings because he was unable to find a pilot to fly the aircraft with the unconventional channel wing alone. Large vertical and horizontal tail surfaces were added at the request of the pilot, for additional control. Actually the principal factors in controlling the plane were amount of power used and propeller pitch, which governed thrust and amount of lift developed by the channel wing.

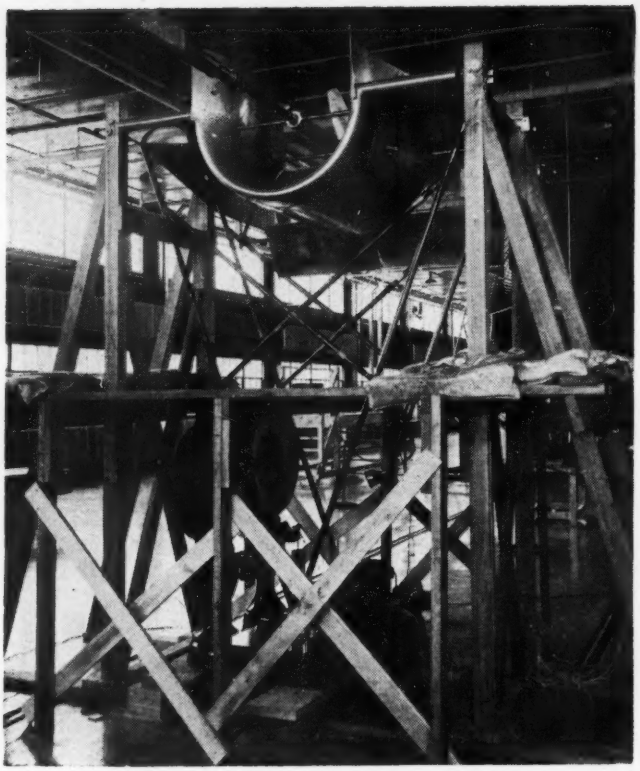
The Beltsville tests were witnessed by a number of AAF and Navy officers and CAA personnel who gave the strange craft its experimental license. The plane was limited to flights in the immediate area of the airport and to 100 ft. altitude, because of wartime restrictions. These limitations made the demonstration, as pictured on the film, even more remarkable. Performance was more like that of a helicopter, than an airplane, Channel wing aircraft takes off with negligible forward run, flies at slow speed, and spot-lands accurately. Wind direction apparently makes no difference to this craft's ability to takeoff or land.

The first plane reportedly would takeoff at approximately 15 mph. forward speed and was never flown at a speed exceeding 60 mph.

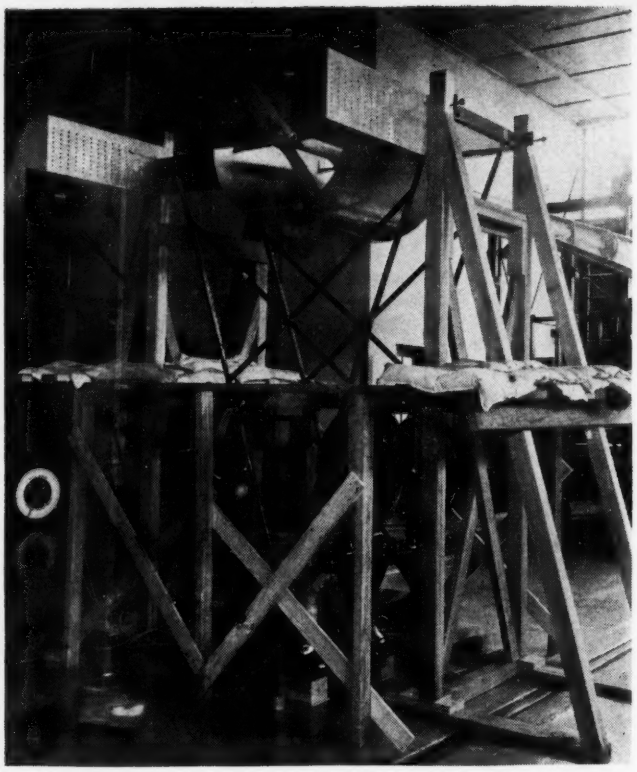
▶ **Tunnel Tests**—A series of tests on the



Except for single tail instead of twin, second Custer plane will resemble this model closely.



Engineers test channel wing at Wright Field.



Electric motor supplied power for propeller at Wright Field.

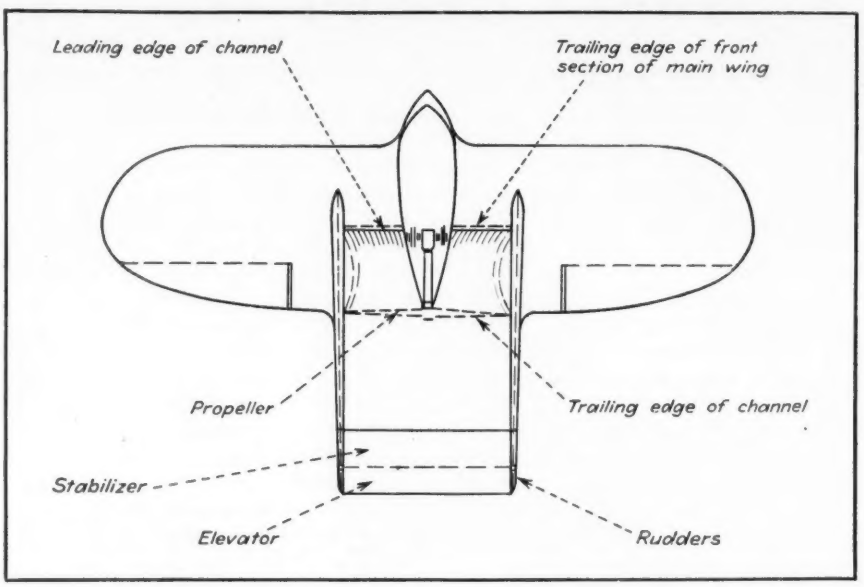
channel wing were arranged at Wright Field in the AAF's small five foot wind tunnel. These included a test of a ⅛ scale powered model, covered in AAF Technical Report No. 5142, and a more extensive series of 53 tests of two models with channels of the same diameter but having different chords.

Concluding Technical Report No. 5568, Young observed the shorter chord channel was superior to the longer as regards resultant force, moment, and change in trim due to power change, and a design incorporating the short channel should have a distinct advantage. Young also reported on static lift tests of the ⅛ scale model which he witnessed at Hagerstown.

While there is no indication that AAF Air Materiel Command will continue its channel wing studies, due to allocation of research funds to other projects, Custer declares that his second plane, incorporating a short chord channel as recommended by Young, will give a performance that will force not only military research engineers, but the commercial aviation industry as well, to accept his development as practical and an improvement over existing wings.

Basically Custer's theory behind the development may be summarized thus:

The channel wing utilizes a principle of lift created by air which is moved over the airfoil, drawn or sucked, by the propeller at rear of channel, creating a powerful lifting force on the wing before the plane starts its forward roll. The channel shape of the wing confines the air within a venturi so that flow depends only on suction of propeller for constancy and is not materially affected by wind changes and other variables.



Single engine personal plane with channel wing design by inventor may be first production article if tests of current model meet expectations.

► **Efficiency**—Custer calculated that his first plane supplied 75 percent of lift necessary for takeoff before craft moved forward, so that only 25 percent additional lift was required to get it airborne. With the new and more efficient channels he expects to get an even greater lift and thrust force while the plane is stationary, perhaps even enough for vertical takeoffs.

The second plane will not use auxiliary wings and will depend entirely on the lift of its channels.

Besides greater lift efficiency, the main advantage of the channel wing is said to be safety. Lift is controlled by the propeller pitch so that aircraft can rise almost vertically and descend the same way as well as fly at reduced speed in event of lowered visibility.

The Hagerstown group hopes to prove the efficiency of the channel wing, and license it to aircraft manufacturers for production. They prefer to continue research and development on other uses rather than enter the manufacturing business. They are willing however to start small scale production, if necessary to get their product recognized and adopted.

Lighter Weight through *Simplified Design*

TWA

NATIONAL AIRLINES

EASTERN Air Lines

AA

UNITED AIR LINES

BRANIFF AIRWAYS — GREAT LAKES TO THE GULF

PAA GRACE

KLM

NORTHWEST NWA AIRLINES

SABENA

another reason why

THE SIMMONDS PACITOR (REGISTERED) GAUGE

is now being specified on equipment for these airlines

An unequalled record of acceptance by leading airlines is a testimony for the light weight and simplified design of the Simmonds Pacitor Gauge. Giving greater accuracy and reliability in the measuring of aircraft fuels and other liquids, the Simmonds Pacitor Gauge has won approval on both sides of the Atlantic. Simplicity of design and special field service equipment make Pacitor the *preferred electronic gauge* by engineers, maintenance crews and pilots alike.

For additional data write:
CUSTOMER SERVICE DEPT.

Simmonds
AEROCESSORIES, INC.

Simmonds PRODUCTS INC.

21-10 49TH AVENUE, LONG ISLAND CITY 1, N. Y. • *BRANCH OFFICES:* DAYTON, OHIO • GLENDALE, CALIFORNIA • MONTREAL, CANADA

Stall-Resistant Craft Seen Through New Design Data

Principles outlined for stall-proofing lightplanes; NACA studying two-control system possibilities.

Personal aircraft accidents resulting from the stall now may be virtually eliminated through the use of design data currently available to the engineer. Complete control of the airplane at slow speeds and high lift coefficients is obtainable through application of principles developed through extensive research. Not only may new aircraft be designed with stall-proof characteristics but existing production models may be modified with a minimum of tooling and production line changes to give them stall-resistant qualities.

If the longitudinal control of an airplane is insufficient to maintain an angle of attack at which the entire wing is stalled, the airplane normally will be laterally stable and controllable throughout its entire range of attitudes and maneuvers.

By restricting the range of elevator "up" movement to an angle slightly less than that required to stall the airplane, the airplane can be rendered incapable of stalling and, therefore, of spinning. This restriction does not impose a design or modification handicap, since the majority of present day personal aircraft have a range of elevator "up" movements only slightly above that required to stall the airplane.

▶ **Objection Refuted**—One of the most frequently voiced objections to restricted elevator control is that it limits maneuverability of the airplane in the air. Repeated tests and thousands of hours of operational experience have proved the fallacy of this contention with respect to non-acrobatic maneuvers, and both loops and minimum radius turns have been accomplished frequently with limited elevator travel, both without using the full deflection available under full power conditions.

The major effect of restricted elevator control upon the landing characteristics is to increase the sinking speed, resulting in a greater impact on the runway. This makes necessary longer landing gear strut travel to absorb this greater shock. In some cases the horizontal distance required to get from a height of 50 feet to the ground can be cut in half. Restricted elevator control also drastically minimizes the skill required to execute a landing insofar as the stick is pulled all the way back and held there as the airplane glides down to contact the ground.

A basic problem of restricted elevator control airplanes is the difficulty in the design of landing flaps. Lowering flaps normally produces a negative (nose down) pitching moment which cannot be accommodated by the elevator since it is already at the limit of its "up" travel. Although the problem is substantially unsolved, research is being pressed on the design of flaps with very small pitching moments and numerous methods are being investigated and have been used by various manufacturers which provide a measure of solution to the problem.

▶ **Controlled Stall**—If the wing root can be designed to stall first with the stall progressing towards the tips, ample stall warning can be provided, the loss in lift will tend to restore the airplane and the aileron effectiveness maintained for a period sufficient to lower the nose of the airplane. Root stalling can be provided in a variety of ways, most common of which is "washout" in which the wing panel is "twisted" either geometrically (by the design of the assembly jig) or aerodynamically (by the selection of progressively changing sections towards the tip). This results in the wing root area flying at a higher angle of attack than the tip area, in which case the stalling angle will always be reached first by the root with the tips stalling last.

Wing taper and sweepback, either separately or in combination, promote tip stalling through the spanwise drift of the boundary layer. A substantially rectangular platform comprises an effective method of producing stall-resistant aircraft.

The use of slots or "slats" along the wing leading edge near the tip is an effective method of preventing tip stall. Location of these auxiliary lift devices in the region of the ailerons preserves stable airflow over the latter at angles of attack substantially higher than that of the unslotted portions of the wing.

Another promising method is the use of a sharp leading edge near the wing-fuselage juncture together with careful filleting of the juncture, which indicates promise in promoting root stall. Still another method is the use of spanwise protuberances mounted on the nose of the wing in such a location as to cause turbulence at a predetermined angle of attack, thereby promoting stalling of the root.

▶ **Restricted Rudder Control**—Restricting the angle of deflection of the rudder would inhibit large yawing motions of the airplane which frequently result in stalls. In conjunction with this restriction a large degree of directional stability should be provided making the reduced rudder travel effective for correcting yawing motions.

One of the important problems inherent in stall-proof design is the different longitudinal stability characteristics of the airplane with power on and power off. Present conventional personal aircraft are so balanced that, for a given elevator setting, much higher angles of attack are attained with power on than with power off. To utilize fully the advantages of restricted elevator control, it is important that the airplane be so designed that for a given elevator setting it balances at approximately the same angle of attack with power on or off. One method of achieving this is to design the propeller axis canted downward, which eliminates or greatly reduces power effects by producing a nose-down pitching moment, which counteracts the nose-up moment due to the slipstream on the deflected elevator.

▶ **Lateral Control Systems**—Disturbances of the airplane's lateral axis are normally created at angles of attack near the stall by movement of the ailerons. This can be minimized through the use of lateral controls which do not promote stalling when deflected at the airplane's steepest attitude. One of the most effective of such methods is the use of a differential linkeage in which the upward deflection of one aileron is considerably larger than the downward deflection of the opposite aileron, thereby inhibiting tip stall created by large downward aileron deflection.

One of the most pressing problems in stallproof personal aircraft design is the application of flaps to restricted elevator control systems. With four-place stallproof designs now nearing the flight test stage, their increased weight and power make the problem of slow landing of pressing importance. Although "pitch-proof" flaps of conventional design appear impossible of attainment, several interesting systems are now under investigation and these will be accelerated through the research and test stage in the coming months. One possible solution is the use of a dive-brake on the upper surface which, when moved up at the trailing edge, tends to flatten out the wing pitching moment.

▶ **Research Program**—One of the important research programs in the field is under way at the Langley Memorial Laboratory of the National Advisory Committee for Aeronautics, which is investigating a large number of possible "two-control" systems linking the rudder and ailerons, stabilizer and flaps and various other combinations in flight with a Fairchild PT-19.

It is clearly recognized that the personal aircraft must far exceed the minimum requirements for satisfactory stability, control and stallproof characteristics in order to reduce required piloting skill to a minimum. Current research and development work, both in Government and industry, are being directed towards this end.

(EDITOR'S NOTE: The foregoing is a compilation of reference material far too extensive to permit listing here. However, if you desire a comprehensive bibliography of stallproof personal aircraft design data, kindly address a postcard to the editors.)

Know How + Perbunan = a top-notch pipe wiper!

THE QUESTION WAS . . . to find out how rubber drill pipe wipers could be made to stand up better under the beating they have to take from constant friction, abrasion and contact with crude oil, gas and other rubber-destroying hydrocarbons in oil field operations.

THE ANSWER WAS . . . A PERBUNAN compound plus the proper design. This combination was developed by research engineers of HARBOR RUBBER & PLASTICS, INC., Long Beach, California, working with the engineers from the BAROID SALES DIVISION OF NATIONAL LEAD COMPANY in designing a replaceable insert pipe wiper. The Perbunan compound provided a flexible, replaceable insert *with exceptional resistance to friction, abrasion, oil, and other hydrocarbons normally destructive to rubber!*

ALSO REMEMBER THIS: Perbunan now contains a new stabilizer that permits its use in a wide variety of colored articles where delicate colors are desired . . . and where discoloration of the rubber part or materials in contact with it would be objectionable.

If You Have a Rubber Question that needs an answer . . . please write to our office nearest you.

PERBUNAN
REG. U. S. PAT. OFF.

THE RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

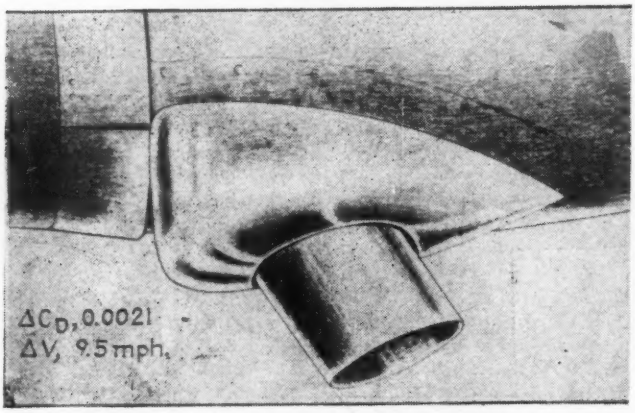
ENJAY COMPANY, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 221 North LaSalle St., Chicago 1, Illinois; 378 Stuart Street, Boston 17, Massachusetts. West Coast Representatives: H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

Copyright 1947, Enjay Company, Inc.

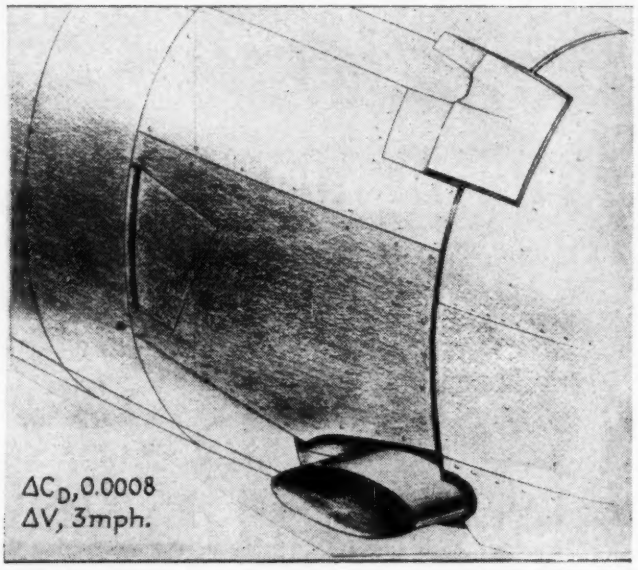
Searching Drag Studies Check Speed Impeders

Five exhaust-stack installations are analyzed in this picture-and-caption presentation.

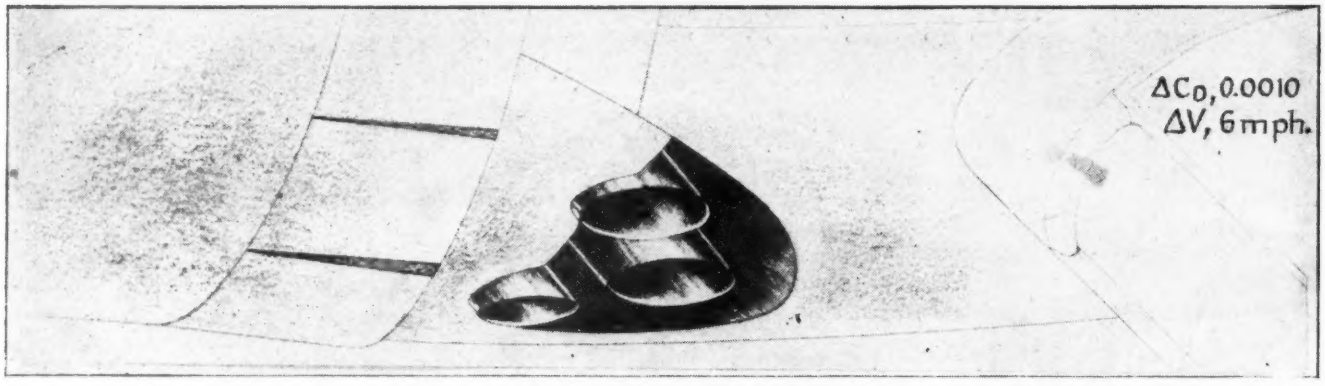
Part VI



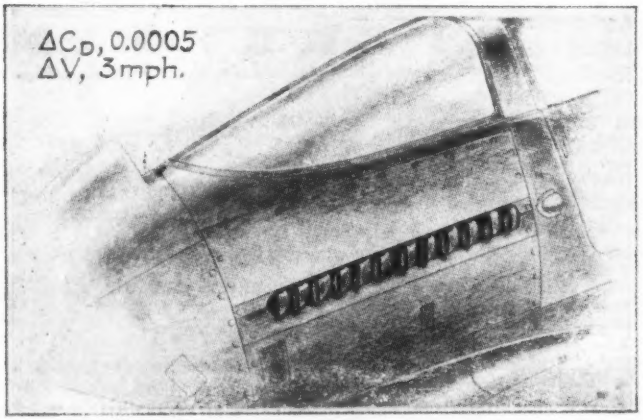
Large protrusion and air leakage around large-bore stovepipe exhaust stacks on this craft account for drag coefficient increment of 0.0021. Engine operating tests at low speed with both original exhaust stacks and individual jet exhaust units indicated that increase in thrust resulting from use of latter would increase plane speed about 13 mph. over that with original installation. This thrust increase includes difference in drag of original stacks and individual jet exhaust stacks. Calculations indicate that with use of optimum size jet exhaust stacks, further increase of approximately 3 mph. would be possible.

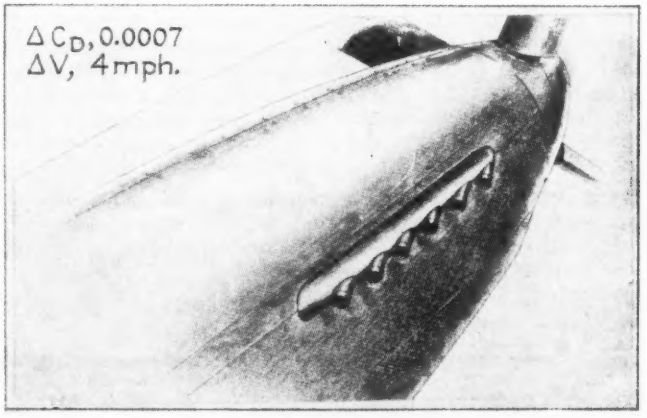


Large-bore exhaust stack with large leakage gaps around it increased drag by 0.0008 on this plane. Recommendation is that use of stovepipe stacks of this type and that shown at left should be avoided because of large form drag.



Removal of seal from exhaust opening of this aircraft increased drag by 0.0010. Form drag of units shown at top has been avoided in this design, but large amount of air leakage from compartment behind engine out through large opening around stacks accounts for excessive drag of installation.. Some of this drag would be reduced by directing leakage flow rearward. Much larger gains can be obtained with installation featuring individual jet exhaust stacks.





Removing sealed metal fairings enclosing stacks on these two planes increased drag coefficient 0.0005 for that seen at left, and 0.0007 for that at right. These exhaust stacks are considered relatively good installations.

Neglecting safety precautions is one sure way to keep your plane from growing old. A less hazardous method is the proper finishing of aircraft. Murphy formulations for finishing, refinishing, and maintenance are designed to help keep planes youthfully trim. You'll find them at airports and refinishing shops the country over or write: Interchemical Corporation, Finishes Division, 350 Fifth Avenue, New York 1, N. Y.

Interchem *Aircraft* **Finishes**

Engineered by MURPHY-ROXALIN

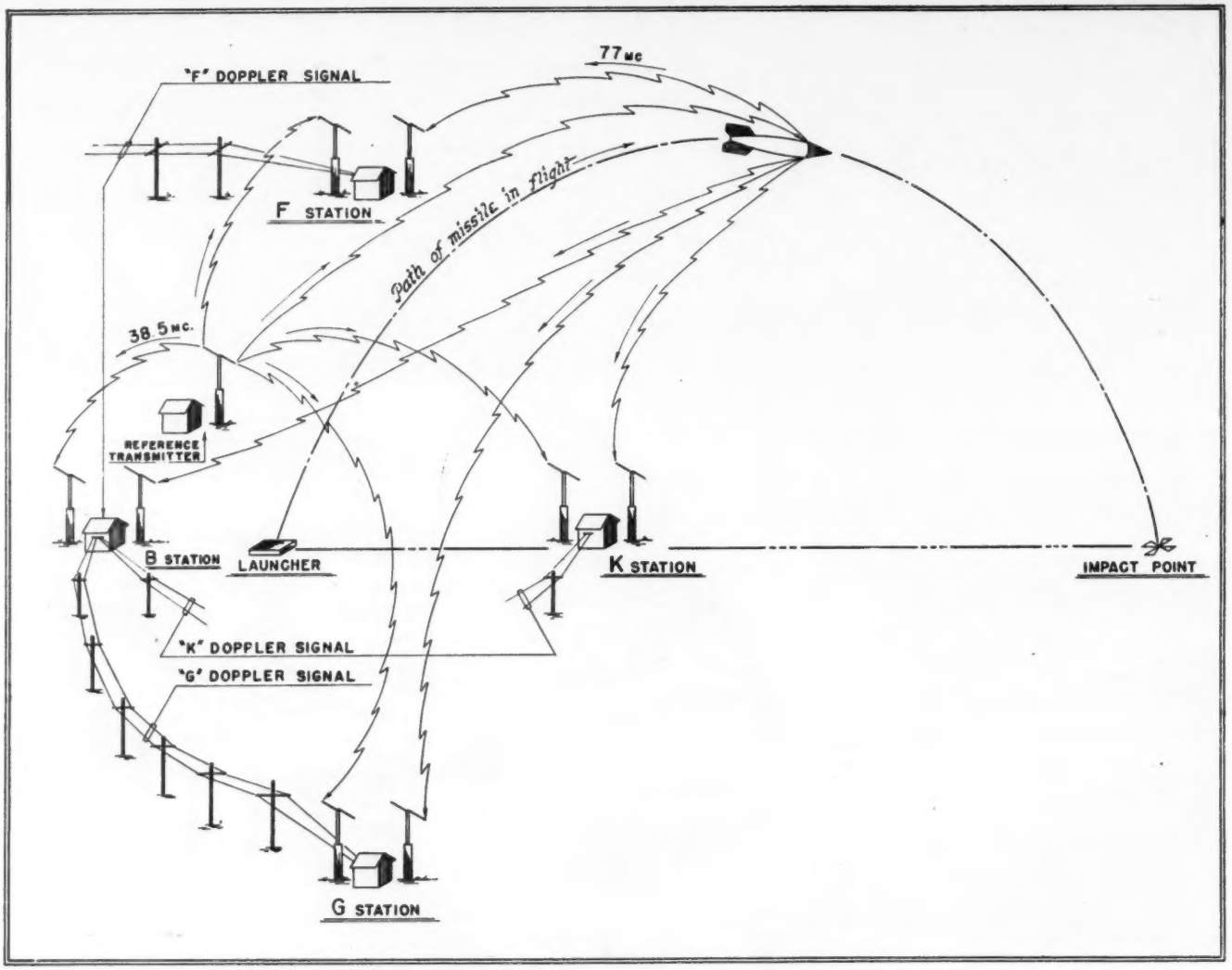


Fig. 1. First sketch of DOVAP installation layout at White Sands range.

Reveal Doppler Tracking For Guided Missiles

Basic factors underlying ingenious recording method outlined in initial presentation.

Present intensive testing programs indicate that the future of guided missiles looms large on the development horizon. Perfection of instrumentation is probably the most important factor in this research phase, and one vital consideration is determination of velocities and positions of the missile. Evaluation of this test aspect is now being investigated with the beacon doppler system—DOVAP (doppler velocity and position).

▶ **System Description**—In general form, DOVAP involves transmitting a radio frequency wave from ground to missile, receiving and amplifying this signal, and transmitting back to the ground a second signal having constant phase relationship to the signal received at the missile. Heterodyning of the transmitted and received signals yields the magnitude of the radio frequency doppler effect. Instead of depending upon energy reflected from the missile body—as is the case when using any of the so-called reflection doppler systems—a signal of considerably greater amplitude is radiated by a missile beacon, extending system range.

As revealed in a paper before a recent meeting of the Institute of the Aeronautical Sciences ("Full-Scale Free-Flight Ballistic Measurements of Guided Missiles," by L. A. Delsasso, L. G. de Bey, and D. Reuyl), basically DOVAP provides for transmitting a stabilized continuous radio frequency wave from a fixed ground station to missile, doubling the frequency of this transmitted wave in the missile receiver, and transmitting the doubled frequency from missile to three or more fixed ground receivers. By amplifying and doubling the received reference frequency and retransmitting this signal, fixed phase relationship is obtained, and this eliminates technical difficulties encountered in attempting the procedure to receive and transmit on a common frequency.

Frequency of the missile signal as received at each ground station is heterodyned with twice the frequency of the original transmitted ground signal. This is accomplished by receiving this reference frequency on a separate receiver at each ground station and doubling the frequency by the same method used in missile receiver. Beat or doppler frequency is produced by mixing radio frequency output from the two receivers. Land wires are used to transmit the doppler signals to a common point for 35mm. records.

Typical DOVAP field setup is shown in Fig. 1, with the various ground stations located approximately as at White Sands.

Each doppler frequency cycle represents a change in path length from transmitter to missile to ground receiver of one half wavelength of reference frequency. From the differences in change of path length to three or more receivers, the spatial coordinates of the missile at any instant may be computed by solving a group of equations representing the intersection of three or more ellipsoids (spheres if the transmitter is coincident with one of the receivers).

Data obtained with DOVAP in final recorded form consist of a long and continuous series of doppler cycle sine waves from each

MONSANTO

SKYLAC

a superior aircraft finish for all-around economy.

Because it covers and protects in fewer coats, Monsanto Skylac saves on labor and materials and cuts costly "lay-up" time in the shop. Outstanding Skylac performance qualities mean more economy, too, as well as maximum safety and operating efficiency. "Standard equipment" on whole fleets of modern airliners, this unique flying finish offers all these advantages:

flame-resistance

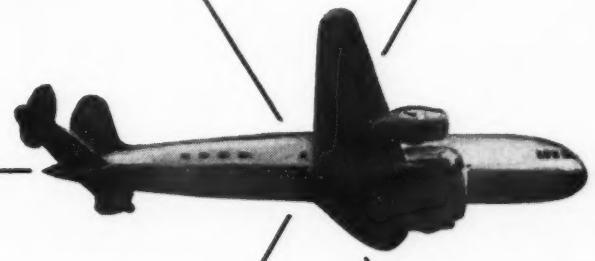
Its slow burning rate meets the most rigid C.A.A. requirements.

economy

Skylac is easy to apply, covers with fewer coats, requires less sanding. It minimizes delays due to weather conditions.

versatility

Skylac may be used for both interior and exterior surfaces.



tautness

Is not affected by humidity.

durability

It stands up longer under the most exacting conditions of ice, rain, sun and roaring gales. Pigmentation is colorfast.

mildew protection

Through a non-toxic, non-bleeding fungicide.

If you are not already using Skylac, write for complete information and technical data. MONSANTO CHEMICAL COMPANY, Merrimac Division, Boston 49, Mass.

Skylac: Reg. U. S. Pat. Off.

MONSANTO CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

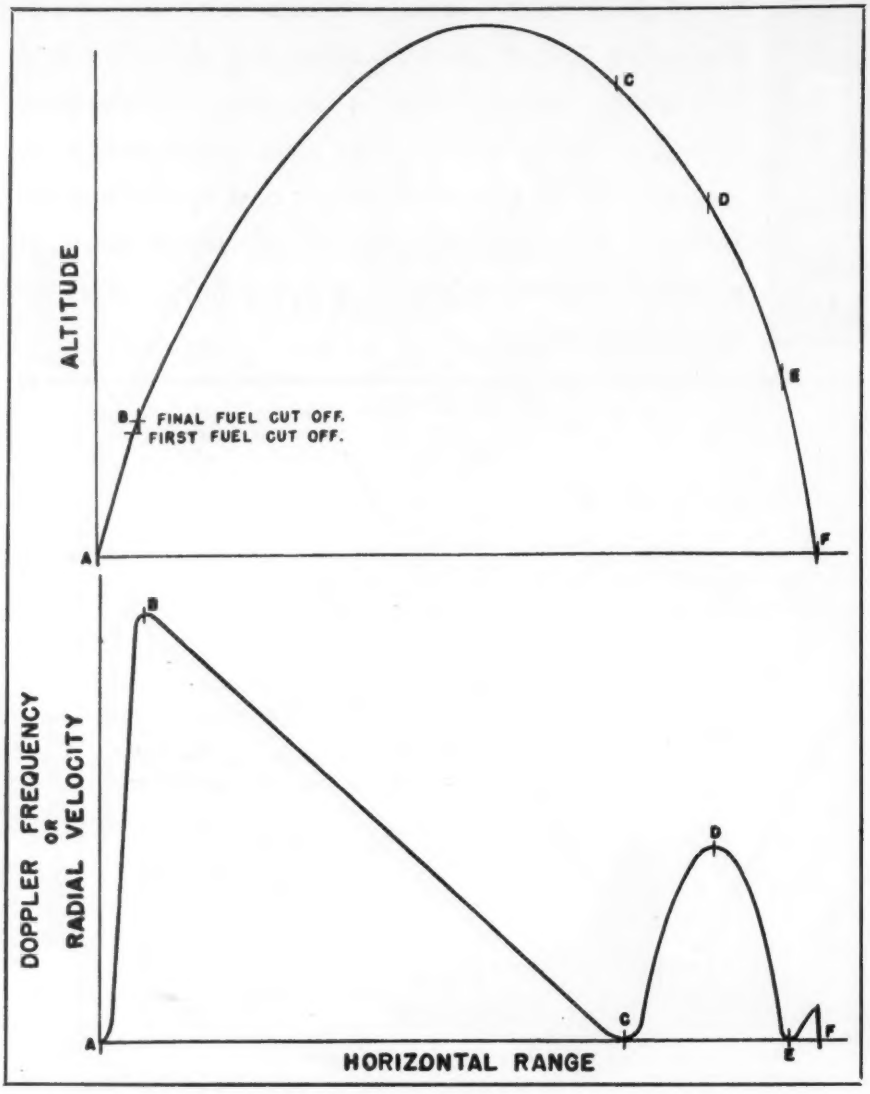


Fig. 2. Representations of rocket trajectory and doppler frequency.

receiving station, and a time calibration of the film record. Assuming that the sine wave traces are continuous from the instant the missile leaves the ground, one point is established on the trajectory, whose coordinates are known. Most any other known point would serve as well, and in practice (since the doppler traces are not always continuous from the start of the trajectory) a point some few hundred or thousand feet along the trajectory, as determined by phototheodolites, is used.

Starting at the known point, each doppler cycle represents a change in total distance from transmitter to missile and from missile to one of the ground receivers of one wave length at 77 mc. or approximately 12.5 ft. If n is number of doppler cycles corresponding to any point along the trajectory the $n\lambda$ is the total change of path distance as the missile moves from the known point to the point to be determined. Hence, it is necessary to count (from the known point) the number of doppler cycles in each channel corresponding to each desired point along the trajectory. It is most convenient to refer to the points along the trajectory in terms of the time elapsing from the start of the flight. If the value of n is determined for successive time intervals, say $\frac{1}{2}$ sec., then the points determined will give the position of the missile at $\frac{1}{2}$ sec. intervals.

Coordinates (x, y, z) of any point on the trajectory may be evaluated by the solution of two linear equations and one quadratic equation, whose coefficients may be determined from known factors involving the coordinates of the ground receiving and transmitting stations, the initial point, and the values of n obtained from the film record. Solution is via electronic computing machine and it is expected that an 800-point trajectory can be computed in the time of flight of the missile—approximately 7 min. Following completion of the problem the machine may be arranged to print the coordinate data in tabular form. It will further tabulate first and second differences between successive points from which velocity and acceleration may be computed.

► **Recording Factors**—DOVAP measures radial change of distance from each of the ground stations. An examination of a typical trajectory (A-4 rocket) reveals that in general there are three points at which the tangent to the trajectory is perpendicular to the line from a particular ground station to the point on trajectory. Thus, the missile is moving in such direction that the radial change of distance is zero, and the doppler frequency will also be zero.

Fig. 2 shows the approximate form of a typical A-4 trajectory and a curve of doppler frequency throughout trajectory. First point at which zero radial change of distance occurs is at the launching location. (For practical purposes it is assumed that all ground receiving stations lie in the same plane and that the missile takes off in a direction perpendicular to this plane. Actually, each ground receiving station may be at a different height—above or below the launching point—and accurate data reduction depends upon precise determination of the coordinates of each station.)

The missile reaches a point just beyond the trajectory peak before the doppler frequency again becomes zero. Between the launching point (A) and point (C) the missile is moving away from all stations. From (A) to (B) the missile velocity, and hence the doppler frequency, is increasing rapidly because of thrust of the burning jet. At point (B) fuel is cut off and the missile continues on its upward path with decreasing velocity until, finally, force of gravity overcomes the vertical component of velocity, and the peak of the trajectory is reached. The missile continues to move away from the receiving stations because of the remaining horizontal component of velocity until point (C) is reached. Here, horizontal velocity and vertical component of velocity resulting from the earth's gravitational field combine to give a net radial velocity of zero.

Between point (C) and the impact point (F) the velocity increases steadily, but because of the geometric relation of trajectory to receiving stations, the radial velocity increases up to the point (D) and then decreases to zero again at the third point, (E). Between (E) and (F) the radial velocity rises until the missile strikes.

This shows the need for d.c. response throughout the recording system. If the response were other than d.c., many cycles of doppler frequency would fail to record as the frequency approaches and becomes zero at each of the points previously mentioned. Also, when the radial velocity is low and true velocity is comparatively high, each doppler cycle may represent a movement of the missile of several hundred or even several thousand feet. This is particularly true at point (E). Thus, the loss of a few cycles of doppler, either because of miscounting of the final record or poor response of the recording system, may introduce large errors in the computed trajectory coordinates. After considering other parameters which affect the accuracy of the system, a permissible error of 1 cycle in 100,000 is allowed under present data reduction methods. Accordingly, the recording system has been designed to accomplish accurate reproduction of all doppler cycles present at the output of the ground receivers.

SAYING "HOWDY!"

TO A BELLANCA

CRUISAIR

Yes, sir! Your head and your heart's in the sky! You're making the acquaintance of a Bellanca!

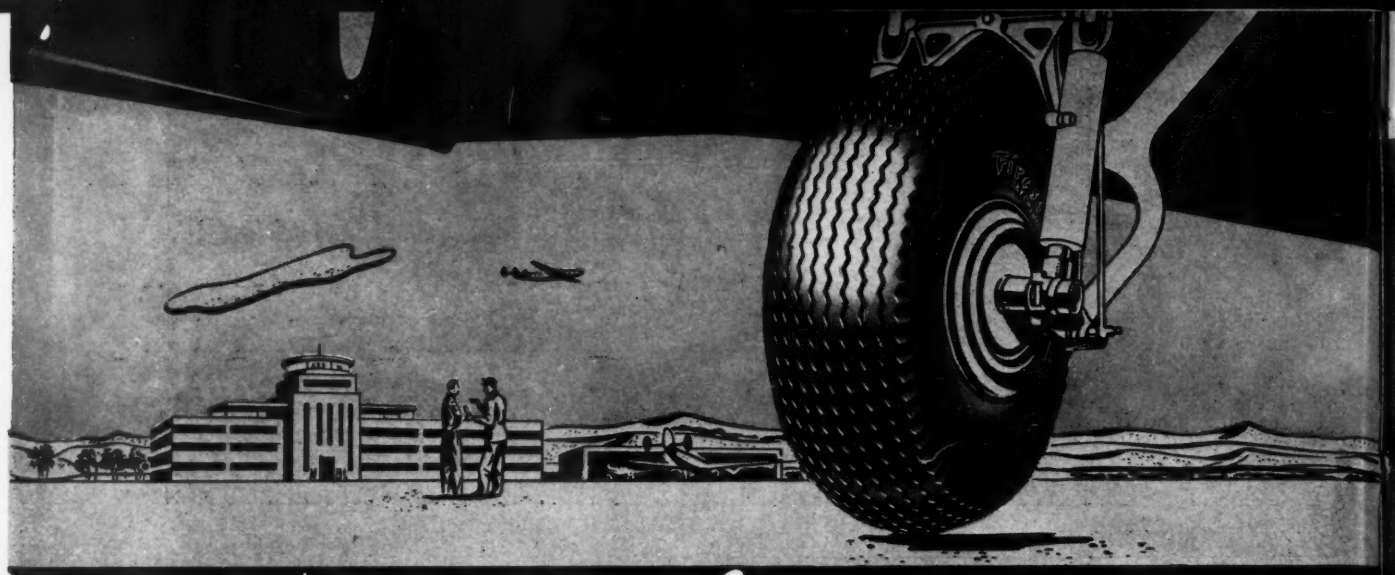
We understand your joy because we're as air-minded as you. The makers of Phillips Aviation Products have developed fuels and lubricants that give real performance and real satisfaction. We know that you want quality . . . and that's how it should be!

Smooth starts, clean engine, uniform fuel performance . . . these are just some of the qualities that Phillips UNleaded 80 octane gasoline gives you. It's a delight to land at any of the Mid-West air fields and "tank-up" with this product!

So, say "howdy!" to one of the orange and black "66" shields, and ask for Phillips 66 high quality fuels and lubricants. The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

Phillips 66

AVIATION GASOLINE



THE NEW *Improved*

Firestone SKY CHAMPION TIRE

Is the safest, best and most economical tire you can buy . . . for commercial, personal or military aircraft

• *here's what it will do*

1. It will provide up to 25% more landings with minimum tire weight.
2. It will provide safer and more positive ground control.
3. It will minimize blowout hazards.
4. It will minimize the number of tire changes between overhaul periods.

GO TO YOUR Firestone • • • • AIRCRAFT DEALER IN ALL IMPORTANT AIRPORTS IN THE U. S.— FOR FIRESTONE AIRCRAFT TIRES AND ACCESSORIES

SKILLED CRAFTSMEN BUILD *QUALITY* INTO EVERY FIRESTONE SKY CHAMPION TIRE

Gum-Dipped Rayon or Nylon Cord Bodies, light and extremely strong, are used in all Firestone Aircraft Tires.

All parts of the Safti-Sured construction tire flex as an inseparable unit to provide greater resistance to heat and safer landings.

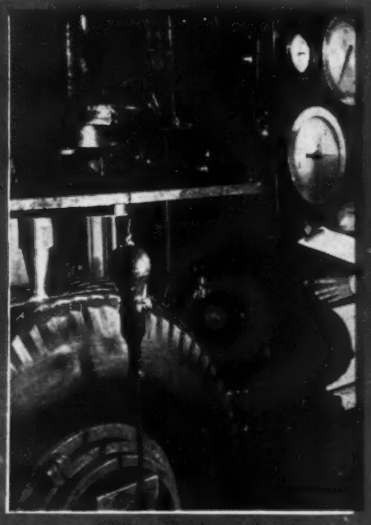
The Firestone Sky Champion tire has no weak spots because it is cured under accurately-controlled pressure and temperature conditions.

Smoother, safer operation of every Firestone Sky Champion tire is assured by careful balancing, on precision equipment, at the factory.

CONTINUOUS TESTS INSURE *BEST TODAY* • *STILL BETTER TOMORROW*

Firestone Sky Champion tires must pass grueling "landing" tests for endurance and heat generation under extreme loads and at speeds up to 125 miles per hour.

And they must prove their ability to resist impact loads far more severe than those encountered in actual service.



FIRESTONE AIRCRAFT COMPANY • AKRON, OHIO

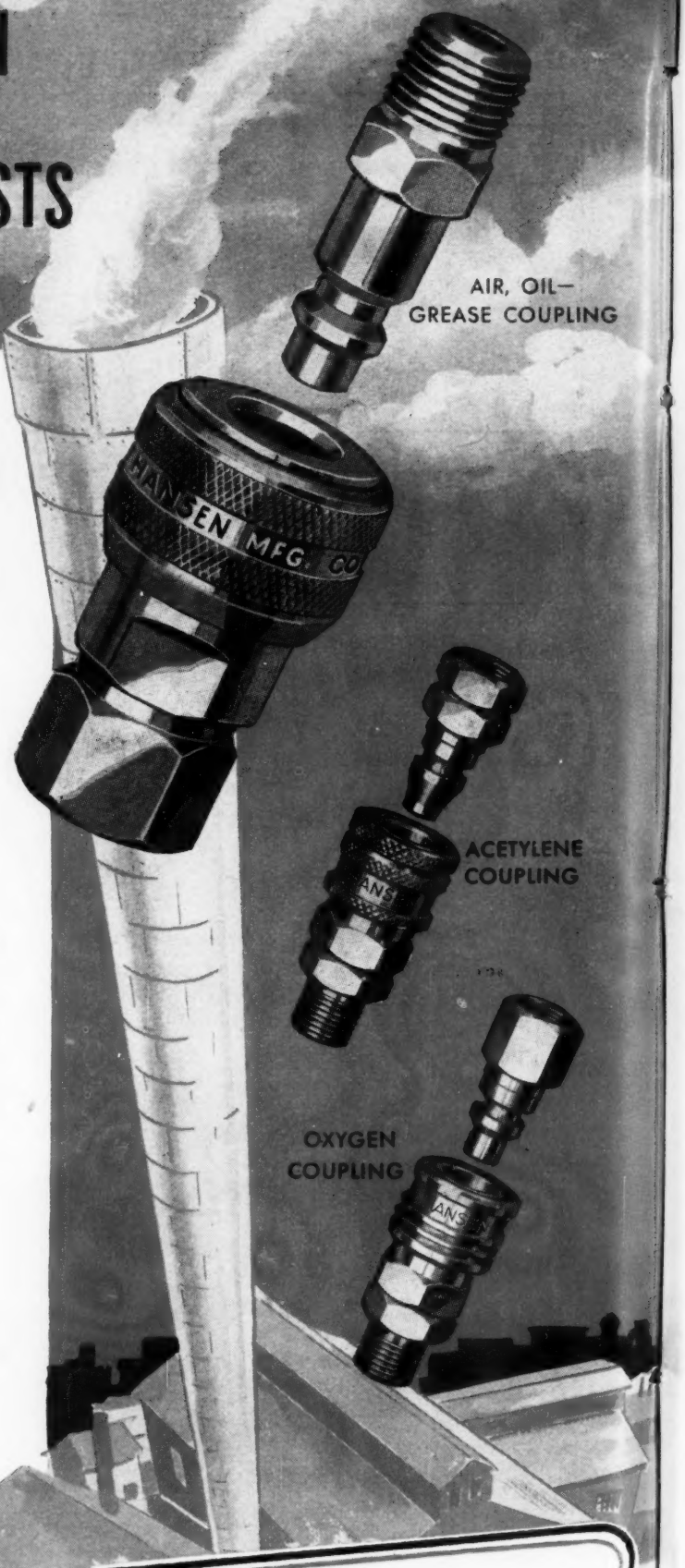
INCREASED PRODUCTION
IS ONE THING
CUTTING PRODUCTION COSTS
IS ANOTHER

HANSEN
COUPLINGS
DO BOTH

Connections and change-overs become a matter of seconds when you use Hansen Couplings. That means time and money saved with no hold-up of costly operations.

Hansen couplings are toughly constructed for hard abuse, yet carefully and simply designed for finger-tip control. Merely insert plug in socket and coupling is connected; a slight pull on the sleeve and it is disconnected. No twisting or manipulating of parts, no leakage. Complete swivel action prevents kinking of hose. Made for air, oil, grease, oxygen and acetylene to handle pressures from ounces to 10,000 pounds.

Write for folder describing
Hansen couplings for industrial uses.



REPRESENTATIVES

New England States:
A. D. GEIGER, Belmont, Mass.

Eastern, Southern States:
B-R ENGRG. CO., Baltimore, Md.

Northern Ohio:
F. & W. URSEM CO., Cleveland, O.

Southern Ohio, West Va., Ky.:
STEINHAGEN AIRLINE PRODUCTS, Dayton, O.

Northern Ill., Eastern Iowa:
NORRIS ENGRG. CO., Chicago, Ill.

Indiana, Wisconsin:
NEFF ENGRG. CO., Ft. Wayne, Ind.

Central Western States:
JOHN HENRY FOSTER CO., St. Louis, Mo., Minneapolis, Minn.

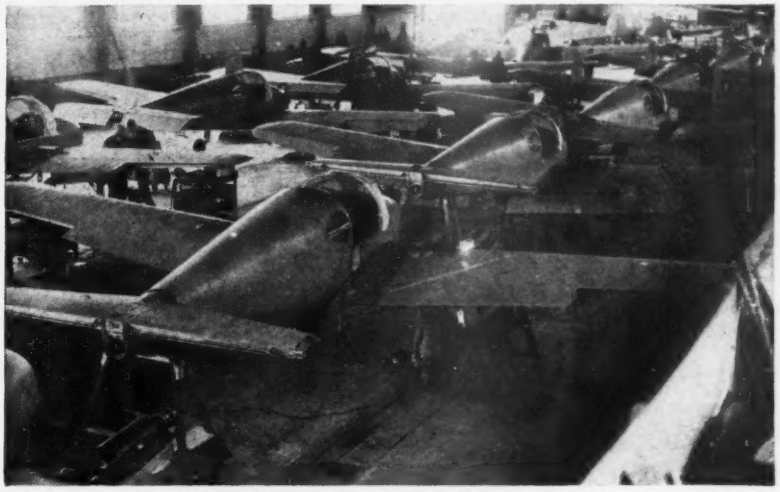
Western, Southwestern States:
BURKLYN CO., Los Angeles, Calif.

Northern Calif., Nevada:
H. E. LINNEY CO., Oakland, Calif.

Michigan:
WM. H. NASH CO., Detroit, Mich.

THE HANSEN MANUFACTURING CO.

1786 EAST 27th STREET • CLEVELAND 14, OHIO



ENGLISH PRODUCTION LINE

Shop of Miles factory packed with Gemini, personal transports. These plywood construction planes are equipped with retractable landing gear and feature top speed of 150 mph. with two 100 hp. Blackburn Cirrus engines. (British Combine photo)

International Currency Needed Says South Atlantic ICAO Conference

New system would eliminate monetary losses by travellers.

(*McGraw-Hill World News*)

RIO DE JANEIRO—The Regional Conference of South Atlantic of the ICAO ended recently after seventeen days of debates in Hotel Quitandinha in Petropolis. Representatives of all the countries interested in civilian flying in this zone attended the Conference that dealt mostly with safety problems along South-Atlantic routes.

Meteorology was one of the chief themes of the meeting and the gathered delegates decided to recommend to their respective governments the establishment of regular weather-stations along the routes equipped, if possible, with radar installations.

Technical sub-committees dealt with matters such as uniform methods for the search and rescue of airplanes that suffered accidents, safety devices aboard the aircrafts and on airports, landing light systems, etc.

One of the major decisions was the basic agreement of all those present to create an international currency for transactions connected with airplane reservations. For instance, a passenger planning to tour the world, purchases approximately the necessary amount of the air currency before leaving home and buys his tickets any place he wants without getting involved with banks and without subjecting himself to possible losses in successive changes of currencies. The delegates suggested that hotels and airports, services (restaurants, bars, etc.) also accept the air currency.

The Conference did not deal with tariffs as it is a matter pertaining only to a meeting of airlines. The International Air Transporters Association scheduled a meeting next October in Petropolis to discuss tariffs.

Czechs Receive Planes From Great Britain

LONDON—Three fighter squadrons totalling 72 Spitfires, a fighter-bomber squadron of 24 Mosquitos, and a communication flight of three Austers and one Anson are among the planes and equipment to be provided by British government to Czechoslovakia.

Some of the aircraft have been delivered and the remainder will be sent as soon as possible. The Czechoslovak government is to pay £354,000 to Britain for the portion of the aircraft and equipment not already supplied as mutual aid under the provisions of the protocol of Jan. 21, 1943.

The sum of £50,000, part of the £354,000, has been charged against the Czech government as part of the war-time credit granted by Britain. Payment of the balance will be made in sterling through the channels established by the monetary agreement signed in London Nov. 1, 1945.

African Carrier Expands Fleet

JOHANNESBURG—South African Airways' fleet of aircraft has increased considerably since operations were resumed in 1944.

Original fleet of six Lockheed Lodestars has been increased to 20 Lodestars, 3 Skymasters, 2 Dakotas and 1 DeHavilland Dove. Three more Skymasters recently were delivered and eight Vickers Vikings and another Dove are to be delivered soon. With the acquisition of these aircraft South African's fleet will total 41 aircraft, with an aggregate passenger capacity of nearly 800.

Diversity of traffic accounts for variety of types, and the fact that there are only two terminal aerodromes in the Union capable of accommodating the Skymasters.

▶ **Joint Operation**—Government-controlled South African Airways operates joint services with BOAC between Johannesburg and London; with Central African Airways between Johannesburg and Salisbury (Southern Rhodesia) and with Deta between Johannesburg and Lourenco Marques under bilateral agreements with the governments of the countries concerned.

Company officials recently inspected Sabena's Douglas DC-6, the first to visit South Africa, but gave no indication whether or not an order would be placed for this type of plane.

S. A. Airways showed a profit last fiscal year. Revenue earned to March 31, 1947, was £1,789,993, of which £1,015,418 accrued from internal services.

FOR BAILOUT SAFETY

New British pilot ejected seat features positive action at high speeds. Pilot B. I. Lynch, who tested the device at 505 mph., demonstrates its operation. Protective covering pulled down to shield face automatically sets off charge which ejects seat and pilot from plane. Seat falls away shortly after clearing plane. (World Wide photo).

Hardsurface runways under construction at Teterboro early this year. (Schell news photo)

Expanded Teterboro Airport Offers Major Base Services

Fred L. Wehran's ambitious reconstruction program puts field in competition with metropolitan terminals; nonscheduled plane movements exceed 1,000 per day.

By ALBERT E. SMYSER, JR.

A $2,000,000 expansion program is raising 25-year-old Teterboro airport, to major base status. This field is unique in the New York area, catering exclusively to nonscheduled flights and itinerant pilots flying every conceivable type of plane, features low gas rates and absence of landing fees.

Activities now include flight training, which has amassed over 50,000 hours flight time in 18 months; established sales and service agencies for practically every commercial aircraft produced in the U. S.; maintenance and repair stations for servicing and overhauling aircraft, engines, propellers, etc., and trained specialists for installation and repair of accessories, radio, and electrical equipment on all types of aircraft.

In the past 18 months two runways originally built by Tony Fokker over 25 years ago, have given way to three 4,500 ft. paved strips. Two of these have already been lengthened to 5,000 ft. and land now owned by airport will permit extension of all three to 7,000 ft. if traffic requires. Land is also available for three additional 7,000 ft. runways parallel to existing strips. Runway and obstruction lights were installed and field approved for night flying in 1946. This brought more cargo flights and operators to airport.

▶ **Traffic Control**—Early in 1946 a control tower, utilizing a "light gun," was erected and operated, dawn to dusk, for 9 months. In October of that year, the gun was succeeded by radio control which offered 8 hours service daily. As traffic volume gained, control tower operating hours were increased first to 12 and a few months later to 24 hours per day.

CAA made surveys of traffic flow and finally approved Government operation of the tower. The activation by CAA of the tower in effect was a grant of Federal aid, the first received by the airport, because it removed tower operators from the local payroll. All reconstruction and improvement to date has been made privately by parties interested in growth of airport, with the cooperation of municipal authorities.

▶ **Operations Increasing**—From a few planes in 1945, the field currently houses between 400 and 500 aircraft of all categories (from Cubs to Constellations). Plane movements have risen from three or four a day to between 1,000 and 1,200 per day, and in 1946 totalled more than 151,000. Indications are that this volume will increase steadily during this and the coming year.

In recognition of this phenomenal growth, CAA has authorized installation of an instrument landing system (ILS), work on which is scheduled to begin within two months. Hope has been expressed in some quarters that a GCA system may be installed sometime next year.

▶ **Air Express Booms**—Air freight business is expanding almost as fast as facilities that handle it. Approximately 1,200,000 lb. freight, moved by 40 independent operators including Willis Air Service, Flying Tiger

TO TRAIN DISABLED VETS

Air Facilities, Teterboro, N. J., fixed base operator, is formulating plans for a flight school primarily for G. I. amputees. Details of the program are being discussed with CAA.

Less than 18 months ago Air Facilities took over the White Flying Service, since then developing into an organization employing 30 people.

When you're glad you have a Snap-on

Veteran aviation mechanics agree that the one best way to correctly tension a stud or bolt to an engineer's specifications is to standardize on Snap-on Torqometers. And the veterans also agree that with a Snap-on Torqometer, you can hit the specified pressure every time . . . right to the correct inch or foot pound. There is no guesswork . . . you can see the applied torque as the bolt is tightened.

Torqometer sizes range from zero to 30 in. lbs., up to 2,000 ft. lbs. capacity. Available through a nationwide, direct-to-user tool service.

SNAP-ON TOOLS CORPORATION
8020-I 28th AVENUE, KENOSHA, WISCONSIN
INTERNATIONAL DIVISION: KENOSHA, WIS., U. S. A.

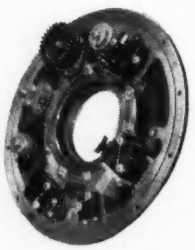
NORTHWEST NWA AIRLINES

Illustrated above is one of Northwest Airline's skilled mechanics accurately tensioning thrust plate nuts with a Snap-on Torqometer No. TQ 150.

Simplicity does it better

An unusual simplicity explains much of the Aeroprop's success story. Entirely self-contained and with no external energy-sources required for pitch-changing or feathering, the simplified Aeroprop hydraulic principle offers unequalled advantages.

Simplicity = Reliability. Here, in one unit, is the heart and brain of the Aeroprop. This regulator is an integral part of the Aeroprop assembly, and contains pump, pressure control valve, governor, feathering valve, etc. Dependent on no supplementary installations and containing fewer moving parts, simplicity pays off in propeller reliability.

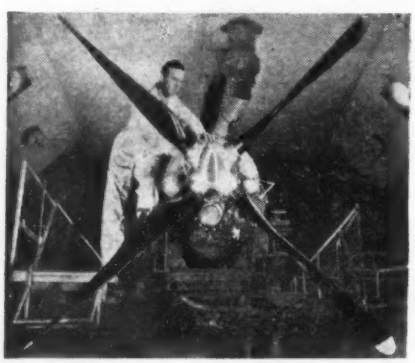


Simplicity = Easy Installation. The Aeroprop is installed as a unit, without special engine or airplane fittings.

Simplicity = Quicker Servicing. A matter of minutes suffices to change single blades or the complete propeller. The Aeroprop is inspected or serviced in record time.

Simplicity = Lightness. Since all weight is concentrated in the Aeroprop itself, airplane design complexities and allowances for weight of supplementary units are avoided. The Aeroprop is lighter, in itself, because of its tough, hollow, ribbed-steel blades.

These Aeroprop principles can be incorporated into propellers designed for aircraft of the future. To get the utmost in results, let Aeroproducts—backed by General Motors—plan with you *now*.



GM GENERAL MOTORS

Aeroprop

BUILDING PROPELLERS FOR AIRCRAFT TODAY
DESIGNING PROPELLERS TO MEET TOMORROW'S NEEDS

This is the Aeroprop—available in single or dual-rotation with instant-feathering, reverse pitch, electric de-icing, and all other features required for any installation. Regulator, hub and blade assemblies are designed for unit installation or replacement. It is strong, light and simple.

AERO PRODUCTS DIVISION • GENERAL MOTORS CORPORATION • DAYTON, OHIO

Line, Meteor Air Transport, and Flota Aera Mercanta Argentenia, pass through this terminal weekly.

Driving force of the airport's organization is Fred L. Wehran, president and general manager. Mr. Wehran says that the rate of progress has exceeded his expectations and he now is formulating plans for doubling the capacity of available facilities; if necessary, to keep place with increased demands. Construction of buildings now under way amounts to over $1,000,000, airport improvements in excess of $1,000,000.

► **Outlook Bright**—If sales of gasoline are a barometer of volume of business at airport, Teterboro is doing very well. In month of April 1946, 900 gal. were pumped. The total has now reached 10,000 gal. per day, with prospects of over 500,000 gal. per mo. in the near future. Oil sales have risen proportionately. These sales break down as follows: light aircraft, 30 percent; transient aircraft, 40 percent, and transport aircraft, 30 percent.

First fixed base operator to come on field, under present management, was Robinson Aviation Corp. in February, 1946; since that time, the number has increased to 36, with many others requesting space.

Other municipalities seeing the need for individual "home town" airports to funnel business to local concerns may profit by the success of this venture in developing their own air terminal projects.

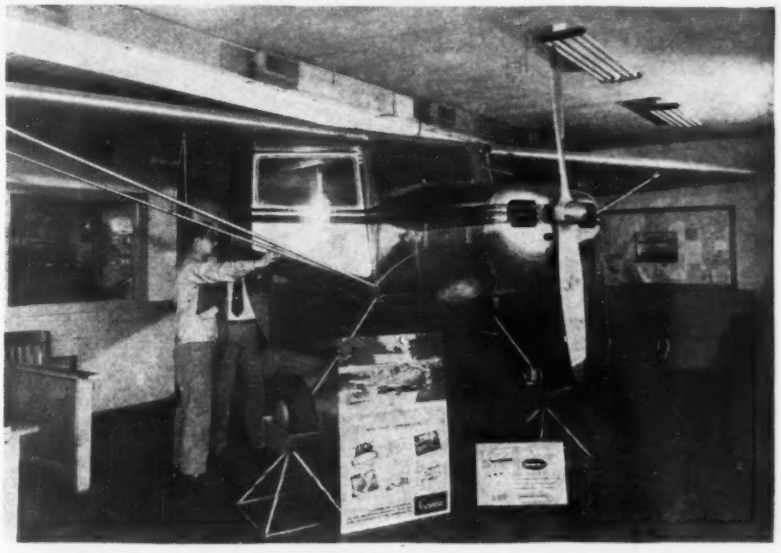
AIA Fund Slash To Cut Activities

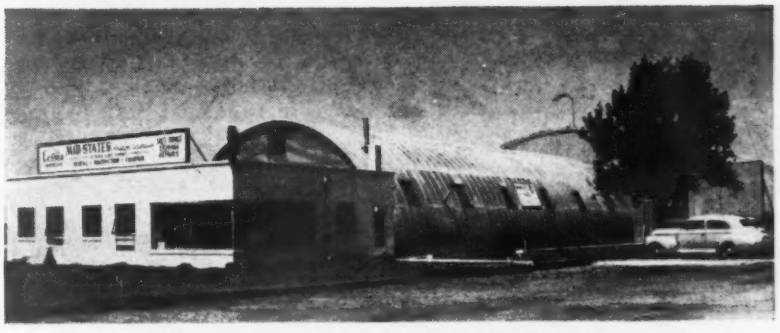
Reduced operations in public relations, Personal Aircraft Council, New York and Los Angeles regional office activities of the Aircraft Industries Association were voted recently by the East Coast members of the Board of Governors in New York City. The new budget, reportedly well under $500,000 goes into effect Nov. 1, having previously been approved by the West Coast Governors in Los Angeles.

The board approved the formation of a patents committee to study the effects of legislation on aircraft and associated industry patents. A major subject of the meeting was industrial preparedness and the organization of an industry-wide policy on reserve capacity and personnel and production facilities. A proposed policy was rejected by some members and a revised policy is now in preparation to be submitted at a future date.

New Stock Issue

Stockholders of Resort Airlines, Charlotte, N. C., have authorized the company to issue 50,000 shares of common stock at $2.25 a share and have re-elected all officers. New directors of the uncertificated vacation tour operator are H. G. Silleck, New York, vice president of the Jacob Ruppert Co., and Don Jamison, New York.





MIDSTATES AVIATION OPERATION

Two years ago, John H. Wilson, aggressive NATA executive director, resigned to go back to aviation sales and service. Now he is president of Midstates Aviation Corp., which operates Sky Harbor airport at Northbrook, Ill., Chicago suburb. Top photo shows eye-catching method used to display Cessna 140 in Midstates showroom, raised in wheel wells which permit demonstration of the spring steel gear. Wilson, Cessna distributor in the Chicago area, is displaying the plane to a customer. Lower photo shows exterior of the Midstates buildings.

NYATA Incorporates Without Capital Stock

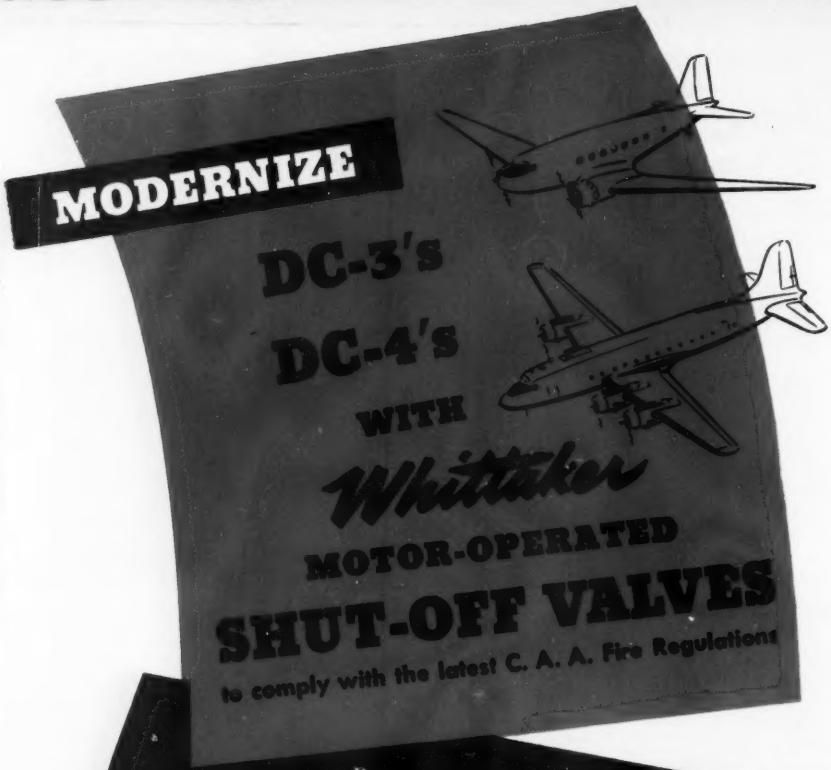
New York Aviation Trades Association, Inc. of Buffalo, has been chartered by the New York secretary of state as a membership corporation without capital stock, with the following purposes: To unite efforts of those engaged in aviation trades in the state in development and encouragement of public interest in flying; individual participation in aviation; aviation education; aviation research and development; fostering of aviation enterprises; study and assistance in developing aviation laws and regulations; preparing codes, trade practices, and standards of operations; develop high standards of employer-employee relationships, conditions of employment and employment benefits.

Directors who will serve until the first annual meeting are: Spencer J. Leech, New York; Anthony Hanzlick, Flushing; Robert Galloway, White Plains; Guy A. Ham, Jr., Glen Falls; V. Richard Ferry, East Greenbush; Henry Scholl, Utica; Thomas W. McNary, Cortland; John J. Drescher, Clarence; Ray Hylan, Henrietta; Kenneth M. Guinnop, Olean; Charles P. O'Connor, Albany; Frederick L. Nugent, Auburn; and Juliet Wells, Elmira.

National Air Clinic Will Discuss Policies

Fifth annual National Aviation Clinic to be held at Springfield, Illinois Nov. 19 to 22 will be pointed towards national aviation policies and results of the clinic discussions will be made available to both the Presidential Air Policy Commission and the Congressional Air Policy Board. The agenda includes the following topics: commercial air transport, personal flying aviation education, air power, national security and world peace, aviation regulation and legislation, aviation economics and the aviation manufacturing industry, airports and airways, international aviation relations problems of general public acceptance and good will, aviation research and development.

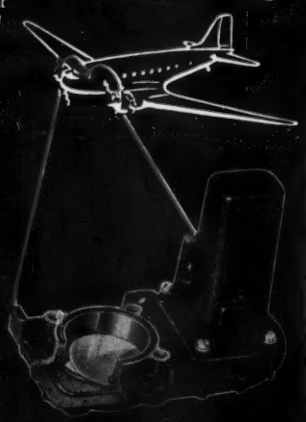
Attending the four day sessions at Springfield will be top aviation experts from all over the country.



Prominent air lines are specifying Whittaker Motor-Operated Shut-Off Valves for modernization of DC-3 and DC-4 aircraft to meet C.A.A. fire regulations. Whittaker Lever and Motor-Operated Shut-Off Valves were the *first* to pass the new C.A.A. fire tests for valves carrying inflammable liquids through the firewall.

CHECK THESE ADVANTAGES OF WHITTAKER MOTOR-OPERATED VALVES:

- Easily installed at lower cost than mechanically-operated systems. Reduces engineering costs and procurement time.
- Exclusive Whittaker *Fluid Seal* gives positive, no-leak, controlled sealing.
- No metal-to-metal contact between moving and stationary parts reduces wear—assures long, trouble-free service.
- Positive, finger-tip control—available with operating times of one to sixty seconds.
- On either conversions or new aircraft, Whittaker Lever and Motor-Operated Shut-Off Valves mean safe, dependable performance.



Detailed information on Whittaker Shut-Off Valves and copies of the C.A.A. fire tests are available on request. WM. R. WHITTAKER CO., LTD., 915 N. Citrus Ave., Los Angeles 38, Calif. Eastern Representatives—AERO ENGINEERING INC., New York 7, N. Y.

Whittaker

DESIGNERS • MANUFACTURERS • DISTRIBUTORS

LEVER AND MOTOR OPERATED SLIDING GATE SHUT-OFF VALVES • DRAIN COCKS • PLUG VALVES • 3-WAY PLUG VALVES • 4-WAY SELECTOR PLUG VALVES • SWING CHECK VALVES • HYDRAULIC CHECK VALVES

New Air Services Are Organized

Air Travel, Inc., has been chartered by New York state to plan and map air travel tours, secure hotel reservations and disseminate air travel information. The new firm will have offices in New York City initially with plans for expansion throughout the U. S.

▶ **Myers Flying Service, Inc.** has been granted a charter for operations at Ada, Okla. Capital stock authorized is $20,000 and officers are Escal A. Myers, Mayo and Melba Cottingham.

▶ **Sisterville Flying Service, Inc.** of Sisterville, W. Va., has been organized with capital stock of $10,000. Owners are William Hubbard, Lee A. Herbold and A. F. Herbold.

▶ **Gates Aerial Surveys, Inc.,** Suffern, N. Y., has been chartered by New York State with capital of $20,000 in $100 shares to engage in aerial survey work. Everett S. Gates, Leland M. Tibbs and Paul H. Fassnacht are directors of the new enterprise.

▶ **Carolina Aircraft Sales, Inc.** at Brockenbrough Field, Charlotte, N. C., has started flight training. According to Ed Brockenbrough, president, construction of three new steel arch hangars, 63 x 60 ft., will begin immediately.

▶ **Grand Central Airport Co.,** Glendale, Cal., has formed a new customer service department combining the former transient service department and the Volador, Inc. shops, previously used exclusively for Ercoupe service. Charles "Chief" Kidder, manager, announces this is the first in a series of moves to return Grand Central airport to its prewar status as center of Southern California personal aviation activities.

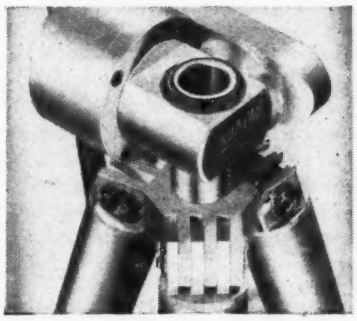
▶ **Aeromarine** of St. Augustine, Fla., has been sold to Paul Calesi, ex-Navy flyer, by Harold Auerbach, founder, who is moving to Washington to take a position with the Civil Aeronautics Administration. Aeromarine operates a flying school, charter service and sales agency for Cessna, Republic Seabee and Taylorcraft.

CAA Supplies Outposts

Skwentna and Farewell, two Alaskan airways outposts situated 70 mi. north of Anchorage and 40 mi. across swampy land from nearest transportation, are now receiving their supplies by airplane. Surface transport methods have proved too slow and uncertain to service these remote stations adequately. Civil Aeronautics Authority now delivers gasoline, oil, and groceries necessary to proper operation of these sites in CAA aircraft. The plan has worked out better than had been hoped and airborne supplies not only reach their destinations on time but also show substantial saving in carrying charges.

Precision fastenings that cut costs— Waldes Truarc Retaining Rings!

Bowed ring gives resilient tension, ends "shimmy," costly machining!



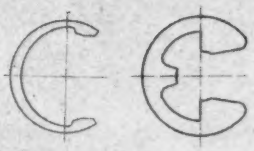
In the Trupan Tripod manufactured by Accmatool Company of New York, a Truarc Bowed* ring positions pivot pin. It exerts a downward pressure of 50 lbs., with two-way spring action. End-play from accumulated tolerances is taken up resiliently. Tension remains constant.

Beveled ring eliminates shims, saves 20 minutes' assembly time!

In the Tachometer Generator of Kollsman Instrument Division, Square D Company, Truarc Beveled* ring absorbs end-play rigidly from accumulated tolerances up to .010. It stays secure against heavy thrust and vibration. Ease of dis-assembly simplifies maintenance and repairs.

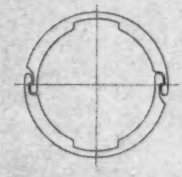
There's a Waldes Truarc precision-engineered ring for every fastening need. Truarc rings give a never-failing grip, keep constant circularity, do a better job of holding machine parts together. Yet they are easily removed and replaced in a few seconds. See what can be done for your product: send your drawing to Waldes Truarc Technical Service Engineers.

OTHER TRUARC RINGS GIVE BIG SAVINGS IN PRODUCTION, MATERIALS AND MAINTENANCE



CRESCENT AND E-RINGS... Snap on radially where axial assembly is impossible. Give firm grip.

SELF-LOCKING*... Economical where thrust is moderate. Shaft requires no machining. Ring holds fast.



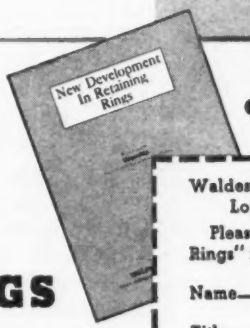
INTERLOCKING... 2-piece ring for heavy thrusts. Positive lock against high RPMs and vibration.

INVERTED*... Uniform shoulder for abutting curved surfaces, for bearings with large corner radii.

*available for both internal and external applications

WALDES TRUARC
Reg. U. S. Pat. Off.
RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK
Canadian Distrib.: Controlite Engineering & Sales Ltd., 20 Bloor Street W., Toronto 5



● *Mail this coupon today for your copy of "New Development in Retaining Rings"*

Waldes Kohinoor, Inc., 47-10 Austel Place 15-5
Long Island City 1, N. Y.

Please send booklet, "New Development In Retaining Rings" to:

Name_____

Title_____

Company_____

Business Address_____

City_____ Zone_____ State_____

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS. 2,302,648; 2,008,454; 2,416,852; 2,420,991 AND OTHER PATS. PEND.

McCauley Props On World Flight Cruisers

Study of equipment used in the supercruiser round-the-world flight which is being made by Clifford V. Evans, Jr., and George W. Truman shows that a large number of manufacturers besides the Piper Aircraft Corp. which provided the airframe, have contributed products for the flight including several new items.

First installations of the aluminum McCauley met-l-prop on Piper Supercruisers, and on the Lycoming 100 hp. four-cylinder O-235-C engine, have been made on the round-the-world cruisers. Increased thrust, and freedom from weather change effects were two reasons for selection of the McCauley props. The engines, provided by Lycoming, are standard supercruiser powerplants except for the propeller installation. Extra tanks holding a gallon of oil, enough for at least 16 hours, have been added, which with the oil normally carried are expected to enable the engines to operate at cruising power for the longest non-stop flights on the trip without danger from oil depletion.

Instruments provided include: gyrosyne compass, combining advantages of magnetic and gyro compasses, and the gyro-horizon both furnished by Sperry Corp.; sensitive altimeter, airspeed indicator with a heated pitot tube, rate of climb indicator magnetic tachometer, free air thermometer, oil pressure and oil temperature gauges and magnetic direction indicator, all provided by Kollsman Division, Square D Co.

Radio equipment, furnished by Bendix Radio, includes a range and broadcast receiver, direction finding facilities, medium frequency and VHF transmitters. Radio equipment operates directly from the plane's battery, an R-33 rebat battery rated at 33 ampere hrs., provided by Reading Batteries, Inc., and designed to operate all electrical devices continually for two hours in an emergency.

Planes are covered with flightex fabrics and reinforcement tape. Grimes navigation lights, standard supercruiser equipment, are installed in the wings, while the new Grimes B3560 ultra-violet fluorescent instrument lights, not generally used on small aircraft, are used to illuminate the instrument panel and provide light for map reading. Delco-Remy 33 ampere belt-driven generators and voltage regulators are supplied, and the aircraft tires are furnished by Goodyear, and the lucite windshields by E. I. du Pont de Nemours & Co., Inc.

Other items supplied include: two pairs of calobar sunglasses for each pilot, provided by American Optical Co.; Eveready flashlights and batteries from National Carbon Co. unit of Union Carbide and Carbon Co., and AP daynite distress signals from Aerial Products Inc., included in the paraft emergency kits with which each plane is equipped.

BRIEFING FOR DEALERS AND DISTRIBUTORS

BRIGHT SPOT—One of the brightest spots in the recent gray personal aircraft picture was the attendance of an estimated 3,500 private aircraft owners at the recent Cleveland National Air Races. Approximately 3,000 of the planes were tied down at Cleveland Municipal alone during the race days and approximately 500 others were reported at outlying airports, according to estimates collected by Lloyd Wilson of AOPA, and Don Ryan Mockler of Personal Aircraft Council. The Cleveland flying of personal planes is believed to have been probably the largest aggregation of lightplanes ever collected, even exceeding the Miami Air Maneuvers Gulf flights.

DRAWING CARD—Biggest drawing card for the private flyers, and for many other race goers, was the Goodyear Trophy Races for midget lightplanes. The fact that all the Goodyear racers used 85 hp. Continental four-cylinder engines, of the type powering many two-place stock models now widely used, and that most of the planes, including the winning Wittman entry, were turning Sensenich fixed-pitch wooden propellers essentially similar to those on many of today's lightplanes added to the interest as did the spring steel fixed landing gears and standard wheels and tires and many other lightplane items used on various planes. Assuming that Goodyear continues the event next year, the 1948 midget plane races will probably be even more interesting since designers will have a better idea of what speeds and characteristics to shoot at, and a number of planes not completed in time for this year's competition should be ready by next year.

BEHIND THE SCENES—On the last qualifying day before the race start was scheduled, the writer had a glimpse of some of the "blood, sweat and tears" which went into the home-made midget racers down at Alliance, Ohio, at Al Barber's little airport. About half the town of Alliance, including many former and present Taylorcraft workers, turned out to watch, and in many cases, contribute their work to get Barber's racer completed in time to make its first test flight and then hurry to Cleveland the same afternoon for qualifications. When we left about 3 p. m. the promising little plane was still unfinished and it did not qualify. It was damaged in its first test flight a couple of days later, and we haven't learned whether Al plans to rebuild it for next year or not. There were perhaps a half-dozen planes being built which did not qualify for similar reasons, and several of these may be in the race next year.

LIGHTER POWERPLANTS—At least one veteran lightplane designer and manufacturer, thinks that development of lighter aircraft engines for personal planes will be a major factor in improving performance and cutting costs to reach a wider market. C. G. Taylor, back at Alliance as president of the recently formed Taylorcraft, Inc., sees the two-stroke cycle engine as a very interesting new powerplant possibility, believes that using more smaller cylinders, to provide additional cooling fin area would solve cooling problems which have been a principal drawback thus far for the lighter two-stroke cycle jobs.

QUIET STINSON—A four-place Stinson Voyager loaned to the Harvard-MIT research group which is working under NACA sponsorship on a personal plane research program, probably will be the first flying test stand, for the Boston organization's quiet airplane experiments. Dr. Otto Koppen, designer of the pre-war two-control Skyfarer plane, is the MIT engineer in charge of the work, which will include testing of various types of multi-blade slow-turning propellers, with a geared engine, and a muffler system which also includes an ejector cooling device.

CLEVELAND DOWNTOWN AIRSTRIP OPENS—Official opening of Cleveland's downtown Lakefront Airport, now far enough completed to permit use by private flyers as a convenient landing spot, 10 minutes by taxi from any point in downtown Cleveland, was by a slight coincidence, arranged to take place about the time the National Air Races started. The field, most of which is a filled area, along the lake shore, provides a 2,200 ft. runway east and west, and parking space for 200 planes. The field is open for daylight flights only until additional field equipment is installed. Metal hangars to accommodate 10 planes, a small administration office, fuelling facilities and other airport equipment will be provided. Field has a special traffic pattern calling for right-hand turns after takeoffs to the west, and left-hand turns after takeoffs to the east, so that pilots flying from the field will not turn in toward the city.

2,000 HOURS A YEAR—Grover Loening, well known aviation engineering consultant, has come to the conclusion that the personal airplane should be used 2,000 hours a year in order to justify its position in our economy by bringing the flight cost per hour down to a sound economic level. This can be approached through two mediums, the flying club, and the company ownership of planes, which are in constant use as executive transports. Loening's analysis, presented before the Royal Aeronautic Society of England, indicates that the individual plane owner needs an income of $12,500 a year in order to devote one quarter of his $9,000 takehome pay after tax deductions to the expense of operating a two-place airplane for his own transportation. He estimates yearly expense for a $2,500 two-place plane at $2,200 a year, including $500 depreciation, $250 hangar storage, $450 insurance, $1,000 for 200 hrs. flying cost including fuel, maintenance and overhauls.

—ALEXANDER McSURELY

Holder of a pilot's license since 1938... considered one of the really veteran cross-country women pilots... and manager of the Auburn-Lewiston Airport, Mrs. H. M. Dingley, Jr., says: "We are sure of giving the flying public high-quality lubricants and fuels when we service with Esso. The constant research that goes into Esso products assures us of high performance... with Esso! More and more, owners who are desirous of fine performance from their airplanes insist upon high-quality Esso Aviation Products."

Signed: — Lucille M. Dingley

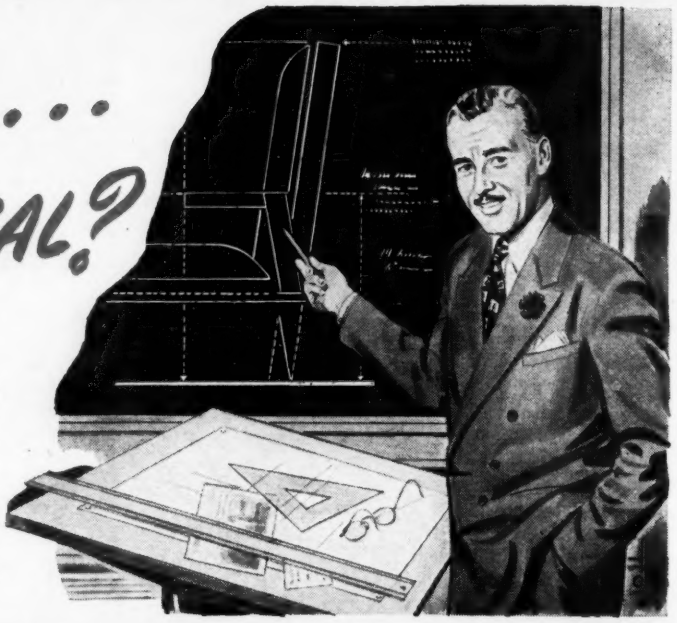
MRS. H. M. DINGLEY, JR., is the efficient and active manager of the Auburn-Lewiston Airport that opened at Auburn, Maine, in 1937.

The right way for an airport to grow, believes Mrs. Dingley, is by rendering *outstanding service.* And part of that service at the Auburn-Lewiston Airport is Esso Aviation Products—the fuels and lubricants that stand for *quality* in the skies.

Behind the high quality of Esso Aviation Products are over 40 years' aviation experience... the industry's largest aviation test cell... and the nation's largest petroleum laboratories—*reasons why* so many of the airport operators who believe in giving their customers satisfaction *now service with Esso Aviation Products!*

No. 20 IN THE SERIES, FEATURING PROMINENT ESSO AIRPORT OPERATORS

YES, IT'S BEAUTIFUL . . . BUT IS IT ECONOMICAL?



• Lumite stands out among seating fabrics not only for its beauty — but for the way its beauty *lasts.* This amazing plastic fabric cuts re-upholstery and maintenance costs because it's immune to the usual fabric hazards. It won't stain, fade, ravel or scuff. Flexible and resilient, it keeps its smart fit to the end. Lumite is available *now* in just the color and pattern to harmonize with your interiors.

Lumite is wearproof · beautiful · luxurious

1.

Unlimited choice of beautiful patterns

The pattern, weave and color-combination possibilities of Lumite are endless! Lumite reflects LUXURY... to the eye *and* to the touch... yet low cost, plus amazing long-wearing qualities, make it a highly practical investment.

2.

Cannot fade... won't stain

Lumite's fresh, bright colors can *never* fade or run. Because it is woven of Dow's Saran, the color is IN the plastic filament itself. *Nothing* can stain it... neither dirt, dust, mud, ink, grease, chewing gum, food, lipstick nor any liquids.

3.

Easy to clean... at less cost

No scrubbing... no vacuuming... no complicated cleaning methods! Easy to clean! That means less time and less labor required to maintain seats... which reduces your annual cost of upkeep considerably.

4.

Pliable... fits snugly... ventilated

Lumite fabric "upholsters well"! It cannot ravel, sag or tear. There is no "cupping." It holds a snug fit on the seat... *permanently!* Because Lumite "breathes", it never becomes sticky in hot weather nor clammy in cold weather.

WRITE TO OUR DEPT. 55—for free samples and descriptive literature. Our trained engineers will be glad to work with you on your special applications.

LUMITE

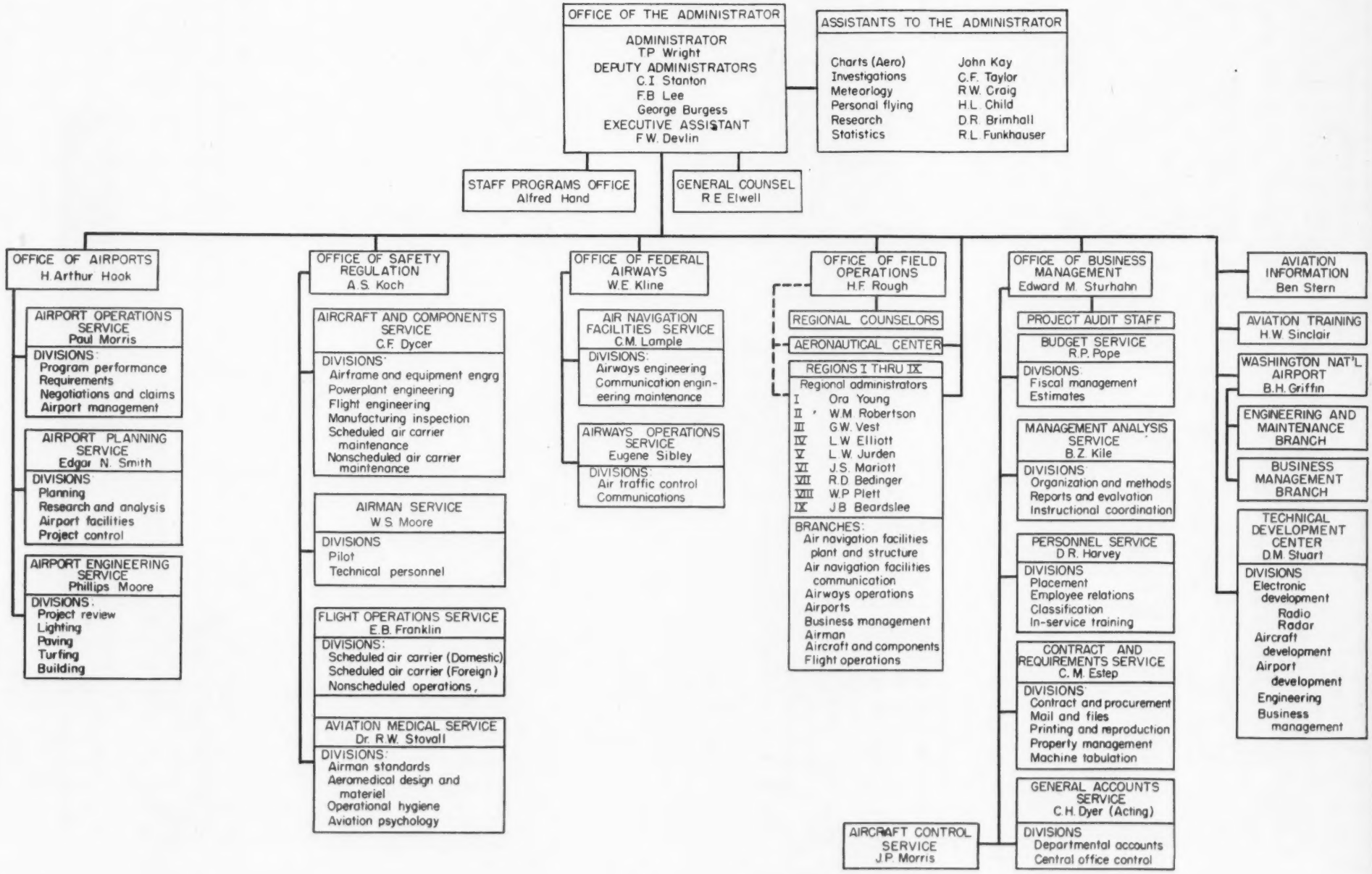
woven plastic fabrics

LUMITE DIVISION

CHICOPEE MANUFACTURING CORPORATION

47 WORTH STREET, NEW YORK 13, N. Y.

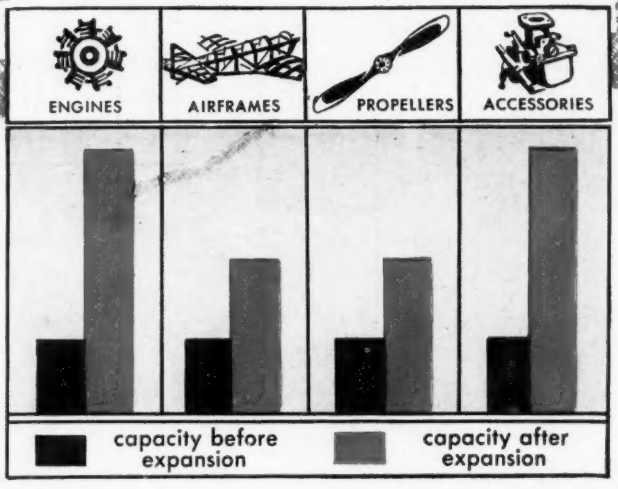
CIVIL AERONAUTICS ADMINISTRATION
Organization chart



Announcement

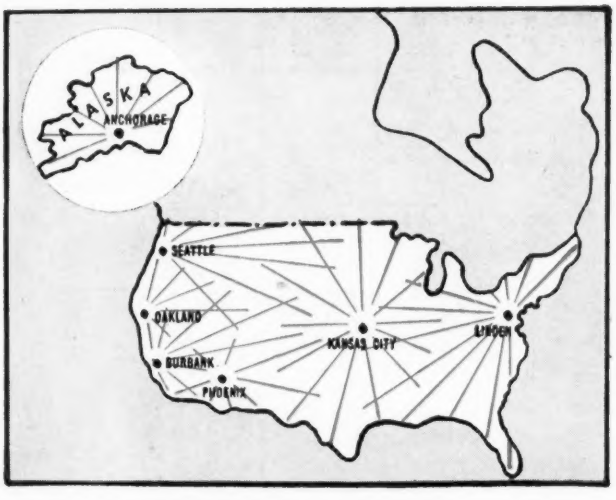
PAC Opens New Bases on Both East and West Coasts

The new Linden (N. J.) and Burbank (Calif.) plants of Pacific Airmotive—aviation's oldest and largest maintenance and supply organization—make possible a new era in service and the distribution of supplies to airport operators, airlines, private flyers.



Modern production-line overhaul requires special tools, tremendous inventories, acres of shop space. These PAC facilities provide prompt, high-quality service at the minimum price.

PAC bases now extend the length and breadth of the nation and to Alaska. Airlines, airport operators, and flyers in every state can now obtain PAC exchange parts, service, supplies.



PAC IS BRINGING SUPER-SERVICE TO AVIATION

In the great new Burbank plant...

...engines, accessories, and other components from the U. S., Mexico, Latin America, and the Orient flow in an endless stream through the modern overhaul lines. This, the largest aircraft overhaul plant yet built by private capital, serves more than 50 airlines.

Linden, Atlantic Division headquarters...

...which is already operating but which is still to be greatly expanded, sends supplies, exchange units, new and overhauled items to eastern U. S., Europe, and Latin America. As in the West, PAC will franchise fixed-base operators as Authorized Dealers.

In Oakland, Kansas City, and Phoenix...

...other expansions of PAC facilities have also become recently effective. It is the aim of PAC to provide every area of the United States with super service based on top-notch facilities plus 20 years of experience in aviation maintenance.

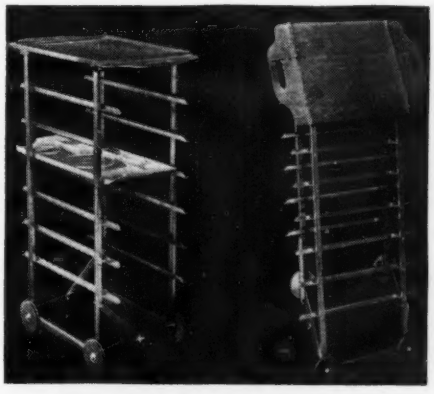
PAC

PACIFIC AIRMOTIVE *corporation*

2940 North Hollywood Way • Burbank, California

MAJOR BASES AT: SAN DIEGO • SEATTLE • OAKLAND • GLENDALE • PHOENIX • KANSAS CITY • FRESNO • BURBANK • ANCHORAGE, ALASKA

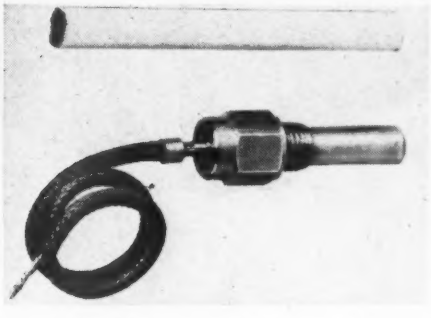
NEW AVIATION PRODUCTS



Simplified tray for service.

Several airlines using this new gyro horizon including UAL, Sabena, KLM and Swedish Airlines.

Self-sealing fuel tank.



Smallest thermostat produced.

Makes Airline Meal Service Easier

Simplification and speed-up of meal service and tray removals in flight is aim of new tray carrier for use by airline hostesses. Developed by Frank Davis, devices designer, it will be manufactured by **Air Associates, Inc.**, Teterboro, N. J. Light in weight, carrier is collapsible for easy stowage when not in use, and it is built in proper width to be rolled up and down aisle of plane with minimum clearance so seats on either side prevent any tipping. Designer Davis got idea for carrier when, on flight from Miami, he noted hostesses had difficulty negotiating aisles with trays when plane encountered bumpy air. Tray is being tested by American Airlines.

Lighter, Quicker-Sealing Fuel Tanks

Self-sealing fuel tanks that save 40% in weight over old type—amounting to reduction of as much as 1,000 lb. in heavy bombers—are announced by **United States Rubber Co.**, 5675 Anaheim-Telegraph Rd., Los Angeles 22. Moreover, new units are stated to be three times as fast in sealing bullet holes, employing special substance which expands when gasoline seeps into it after puncture by projectile, thus closing wound. Improved tank is reported to accommodate kerosene fuel used for jet engines as efficiently as gasoline. In photo, technician demonstrates lightness of new self-sealing tank material in contrast to old type.

Gyro-Horizon for New Craft

Latest gyro-horizon manufactured by **Sperry Gyroscope Co.**, Great Neck, Long Island, N. Y., is this Model H-3. Instrument is electric driven, and being non-tumbling and requiring no caging, it provides unlimited indications in bank. Horizon bar shows climbs or glides to plus or minus 27 deg.

Midget Aero Thermostat

Plug-Stat, thermal control and limit switch under development since late 1946 by **Control Products, Inc.**, 306 Sussex St., Harrison, N. J., is designed to warn of excess temperatures in aircraft gear boxes, bearings, and the like, giving high or low indications in fluids under pressure, or static fluids such as oil, and also gaging liquid temperatures in cylinder heads or exhaust stacks. It is installed by merely drilling and tapping N.P.T. or N.F. threads. Electrical characteristics: Operates on a.c. or d.c. 28v. 2 amp., one side normally grounded to case; can be had in normally open or closed circuit. Physical characteristics: Case made of cold rolled steel, brass, or stainless steel, according to application; hermetically sealed against pressure, moisture, and dirt; built to withstand severe vibration and abuse; weight .67 oz. Photo shows how unit compares in size with cigaret, company calling this thermal limit switch the smallest currently produced.

Information Tips

Material-Test Computer

Slide-rule type computer for speeding calculations in material planning and testing work has been developed by **W. C. Dillon & Co.**, 5410 W. Harrison St., Chicago 44. As example of rule's use, operator need only set scale for specimen size, then read braking strength opposite psi.—instead of using long method of figuring specimen cross-sectional area and multiplying this area times the psi. Knowing any two factors, device gives third factor, thus psi., or how big to make a specimen, or what load is needed are readily ascertained. One side of rule covers rectangular specimens from 1/32 in. to ¼ in. thick by ½ in. to 1⅝ in. wide, from 0 to 150,000 lb. psi.; while other side covers round specimens 1/16 in. to 1 in. dia., up to 100,000 lb. psi. Company is mailing computer free to accredited engineers and designers who write in giving full name, company, and title.

Large-Screen Oscillograms

Projecting of oscillograms into large-screen images up to 12 by 12 ft. size for lecture and demonstration purposes is now possible employing Type 2088 lens developed by **Allen B. DuMont Laboratories**, 2 Main Ave., Passaic, N. J. Information on this accessory may be obtained from company, which states lens is intended for use with oscillographs employing Type 5RP-A high-voltage cathode ray tube.

Rescue Procedures Detailed

Step-by-step procedures in aircraft rescue and fire fighting are given in 15-page booklet of suggested standards issued by **National Fire Protection Assn.**, 60 Batterymarch St., Boston 10, Mass. On basic premises of rescue of persons and of fire fighting to expedite such rescue, the varying conditions are broken down—on airdrome, on land; off airdrome, on land; and on or off airdrome, on water. Specific situations treated are: Anticipated crash landings, potential crashes during takeoff, unexpected crashes at the field, crashes at reasonably accessible distances, and those occurring beyond such radius. Charge of 25c. is made for single copies of booklet.

Neon-Glow Indicators

Information on "Indiglo" neon-glow indicators, suitable for location, on-off, and pilot-light use on aircraft instrument panels, is available from maker, **Littlefuse, Inc.**, 4757 Ravenswood Ave., Chicago 40. Two models, "Flush-Lite" and "Post-Lite," are offered in clear and white molded polystyrene shells or, on special order, in clear, red, or amber high-temperature Lucite.

Toward New Simplicity in Measurements

"Simplification of basic terminology used in defining operating principles of measurement systems that use electrical means" is purpose of Bulletin GET-1344 issued by **General Electric Co.**, Schenectady, N. Y. Titled "Analysis of Measurements" and prepared by I. F. Kinnard and H. C. Dickinson, the 28-page pamphlet describes uses of functional analysis method, including applications to research and development problems, to compilation of statistics, and to coordination of activities. Sought are patterns resulting in more complete lists under primary detectors, intermediate means, end devices, and basic elements. There are 19 diagrams, together with a full-page chart depicting frequency of basic elements relative to different types of quantities measured.

Valve and Pump Catalog

Engine valves, valve seat inserts, rotor pumps, coil springs, and other items for aviation market are covered in new pocket-size, 1947 edition "Products of Eaton" catalog issued by **Eaton Mfg. Co.**, 739 E. 140th St., Cleveland 10, Ohio.

Re Industrial Design Services

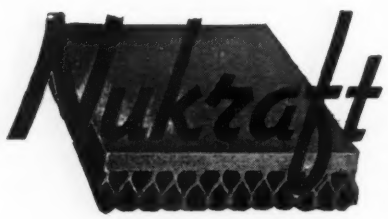
"How to Use an Industrial Designer" is title of pamphlet from **Society of Industrial Designers**, 48 E. 49th St., New York City 17. Ten specific questions of businessmen regarding these functions are answered, thus the aviation executive may gain perspective of values afforded through retaining such services.

Reconditioning of Carbide Tools

"Grinding Carbide Tools" is 140-page, spiral-bound handbook issued by **Norton Co.**, Worcester 6, Mass. Divided into nine comprehensive sections, this well-illustrated publication gives full information on rapid and economical reconditioning and sharpening of cemented carbide tools and cutters.

Comfort— WINGS ITS WAY TO NEW HEIGHTS

with FLYLIGHT



Yes—in mighty giants of the airways—or in private planes—Nukraft, the patented figure 8 hair-latex cushioning, brings to pilots and passengers the utmost in comfort and relaxation.

Available with or without foam rubber topper pads, it gives luxurious comfort without sacrificing weight specifications—makes a smooth upholstery base. Easy to apply, Nukraft can be pre-cut to any shape, if desired—thereby reducing production costs. It can be sewed, tacked, or tied into position. It's economical too. Write for complete facts today.

Cushioned with Nukraft

PATENT NO. 1,988,843

DEVELOPED AND PATENTED BY B. F. GOODRICH CO

Nukraft MANUFACTURING CO., INC.

SHELBYVILLE, IND.

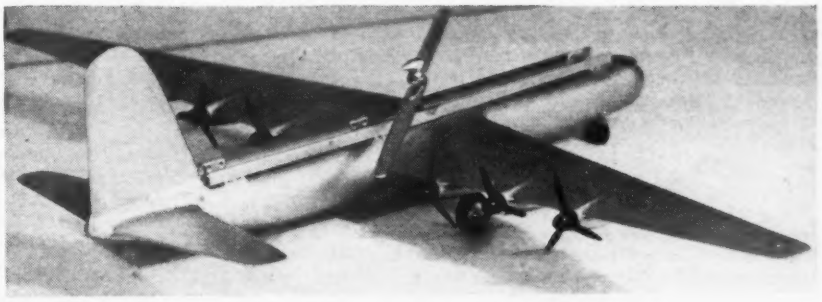
CABLE ADDRESS:

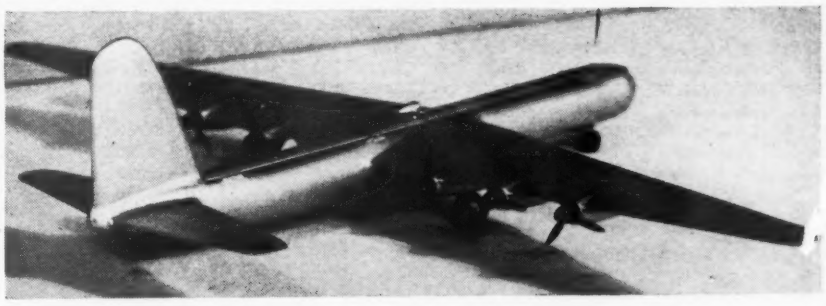
NUKRAFT—Shelbyville—or PAULHAREX—Chicago

FROM TRANSPORT PLANE TO AUTOGIRO

Antoine Gazda, Providence, R. I., inventor and helicopter developer, has patented a device for in-flight conversion of a transport plane to an autogiro to obtain slow landing characteristics in case of power failure. Although planning to install his device experimentally in a DC-3, Gazda has used a model of Consolidated Vultee's giant B-36 bomber for demonstration purposes. The two-blade rotor is concealed in the top of the fuselage by a door running full length. When the door is opened, the rotor projects up and autorotates to provide lift. A rotor for a plane as large as the B-36 would measure 120 ft. and add 3,400 lb. weight to the plane. An installation in an actual plane would provide for doors sliding sideways into the fuselage. The rotor would have to be mounted over the center of gravity of the plane

Gazda





Great Lakes Area Granted Helicopter, Feeder Services

CAB member Harllee Branch takes dim view of results in short-haul experiment to date and will oppose certification of more mileage.

By CHARLES ADAMS

An experimental intra-city helicopter service which will carry passengers and property but no mail has been authorized for the first time in a CAB decision which also provided for cautious extension of the feeder network into Illinois, Indiana, Michigan and Ohio.

Highlighting the Board's action in the Great Lakes Area case was a dissenting opinion by member Harllee Branch, who opposed the majority's approval of new feeder routes for Parks Air Transport, East St. Louis, Ill., and Roscoe Turner Aeronautical Corp., Indianapolis, Ind. Branch expressed disappointment with feeder progress to date and said he did not intend to sanction any new experimental short-haul routes until the results of three years' experience with presently-certificated systems can be evaluated.

▶ **Eighth Case**—The Great Lakes case was the eighth area proceeding decided by CAB and enlarged the approved local service network to more than 20,000 miles to be operated by 16 carriers. Opinions are still to be handed down in the Mississippi Valley, Middle Atlantic and Arizona-New Mexico cases.

In granting Yellow Cab Co. a three year permit to operate helicopters in the Cleveland, O., area, CAB said the experiment would definitely promote the public interest without tapping the public treasury through mail pay. The two routes authorized are between Cleveland Municipal Airport and a terminal point in downtown Cleveland; and between the airport and the suburb of Euclid, O., via Shaker Square.

▶ **Time Savings**—The cab company has set aside $250,000 for the helicopter project and plans to use four-place Sikorsky S-51s to start service. Savings in time via helicopter over existing limousine-taxicab service would be 9 minutes, or 63 percent, from downtown Cleveland to the airport; 40 minutes, or 73 percent, from Shaker Square; and 50 minutes, or 63 percent, from Euclid.

Both of the feeder operations authorized for the Great Lakes area will be certificated upon a showing of adequate airport facilities along the routes designated. The requirement of adequate airports as a qualification for three-year short-haul certificates was placed in two previous area decisions.

▶ **New Links for Parks**—Parks was selected to operate links between Rockford, Ill., and the co-terminals St. Louis, Mo., and East St. Louis, Ill., via La Salle-Ottawa, Ill., Peoria, and Springfield; between Galesburg, Ill., and Indianapolis, Ind., via Peoria, Bloomington, Champaign-Urbana and Danville, Ill., and Crawfordsville, Ind.; and between Indianapolis and the co-terminals St. Louis and East St. Louis via Crawfordsville, Danville, Champaign-Urbana, Decatur and Springfield.

Routes granted Roscoe Turner Aeronautical Corp. are two north-south links between Grand Rapids, Mich., and Cincinnati via Kalamazoo, Mich., South Bend, Logansport, Kokomo, Indianapolis and Connersville, Ind.; and between Chicago and Louisville, Ky., via Kankakee, Ill., Lafayette, Indianapolis, Bloomington and Bedford, Ind.

▶ **TWA Extended**—No feederline was selected to provide extensive service within Ohio, but the certificates of TWA were amended to give that state additional local-type operations. The carrier's Indianapolis-Dayton segment of AM 2 was extended from Dayton to Cleveland with authority granted to serve Springfield, Marion and Mansfield, O., as intermediate points and permission to operate nonstop service between Indianapolis and Cleveland.

War Assets Administration **SURPLUS**

We've a $20,000,000 stock — over 7,000 different items — to assure quick delivery. All components and parts are certified by experts to be in represented condition. The prices listed here are typical of the thousands of items in our new catalog. May we send you a copy?

AIRCRAFT

Douglas C-54A's and C-54B's. Converted to cargo or passenger type
Douglas C-47A's. Cargo and 21-passenger type
Douglas DC-3's. Certificated for air line operation
Beechcrafts—Twin Engine. Model C-18-S and AT-11's
Grumman G-21 Amphibian
PBY-5A Amphibians
AT-6's
Avro Anson V's

Other aircraft available upon request

ENGINES

Factory overhauled Pratt & Whitney 1830-92
New Pratt & Whitney R2800-83A
Overhauled R985—AN-1 and AN-3
Wright G-102's—Airline overhauled
New Packard Merlins

GENERATORS

TYPE	Mfr.	Part No.	R.P.M.	Voltage	Amps	NET
O-1	Leece-Neville	22600	2500/4500	24	100	$112.50
O-1	Leece-Neville	22602	2500/4500	24	100	112.50
O-1	Leece-Neville	22604	2500/4500	24	100	112.50
O-1	Leece-Neville	S-24250	2500/4500	24	100	112.50

STARTERS

TYPE	Manufacturer	Part No.	Rotation	Voltage	NET
JH3R	Jack & Heintz	280R3	R.H.	24	$150.00
JH4-FR	Jack & Heintz	2330R3	R.H.	24	150.00
JH5B	Jack & Heintz	540R12		24	75.00
H-6	Eclipse	444-4F	R.H.	12	168.75
J-1	Eclipse	756-21B	L.H.	24	97.50
G-6	Eclipse	915-4E	R.H.	24	168.75

PROPELLER ASSEMBLY

MANUFACTURER	PART NUMBER	NET
Hamilton Standard	23E50-473-6353-A-18	$1,239.00
Hamilton Standard	23E50-473-6477-A-0	899.50
Hamilton Standard	23E50-505-6477-A-0	899.50

BLADE ASSEMBLY

MANUFACTURER	PART NUMBER	NET
Hamilton Standard	6477-A-0	$112.50
Hamilton Standard	6507-A-0	262.50

GOVERNOR ASSEMBLY

MANUFACTURER	PART NUMBER	NET
Hamilton Standard	4G8G23G1	$150.00
Hamilton Standard	4K11G0J	150.00
Hamilton Standard	4K11G0L	150.00
Hamilton Standard	4K11G1J	150.00

HUB ASSEMBLY

MANUFACTURER	PART NUMBER	NET
Hamilton Standard	23E50-473	$562.00
Hamilton Standard	23E50-505	562.00
Hamilton Standard	33E60-125	1,170.00

Complete stock of parts for HAMILTON STANDARD propellers. Send for catalog.

VACUUM PUMPS (Engine Driven)

Type	Mfr.	Part No.	CFM	Drive	Port Size	Net
B-8	Pesco	3P211J	17	12T Spline	¾"	$49.50
B-8	Eclipse	119626-610-2C	15	12T Spline	¾"	49.50
B-12	Pesco	3P207JA	7½	12T Spline	½"	42.50

HYDRAULIC PUMPS (Engine Driven)

MFR.	PART NO.	PORT POSITION	PORT SIZE IN	PORT SIZE OUT	ROTATION	NET
Pesco	1P203LA	End	½	½	Either	$37.50
Pesco	1P203LC	End	½	½	Either	37.50
Pesco	1P203UB	End	½	½	Either	20.41
Pesco	1P349L	End	½	½	Either	35.50

PRATT and WHITNEY Engine Parts

for R985, R1340, R1830, R2000, R2800 Engines

(Less 25% from AAF List Prices Shown)

Part No.	Description	List Price	Part No.	Description	List Price
104	Bearing	$ 2.13	31606	Valve	$ 13.75
122	Bearing	2.13	32634	Deflector	147.73
3965	Gear	58.60	34378	Impeller	189.18
9269	Liner	5.99	34547	Crankcase	621.31
11730	Bearing	19.38	34846	Cylinder	119.30
14375	Crankcase	223.54	34847	Cylinder	119.17
15373	Piston	12.76	34849	Cylinder	184.71
17350	Valve	4.97	34869	Cylinder	117.96
19667	Ring	.56	35204	Impeller	54.04
20218	Bearing	14.64	35570	Pump	133.58
20506	Rod	20.58	35780	Piston	11.88
26389	Bearing	3.20	38445	Impeller	214.43
29280	Bearing	7.50	44098	Cylinder	243.21
31276	Bearing	.85	44103	Cylinder	239.23
31406	Ring	.55	50512	Ring	.36
31498	Bearing	48.21	91470	Piston	6.66

Complete stock of PRATT and WHITNEY engine parts available for immediate shipment. Send for catalog.

MAGNETO PARTS

(Less 25% from AAF List Prices Shown)

AMERICAN-BOSCH Part No.	Description	List Price	SCINTILLA Part No.	Description	List Price
PL-716	Plate	$ 1.20	10-1239V	Distributor	$13.00
MA-5215	Magnet	4.90	10-4206Y	Magnet	7.33
IS-5231	Insulation	2.20	10-5049	Bushing	2.78
RT-5233	Rotor	8.20	10-5908Y	Shaft	3.92
CW-5238	Condenser	.70	10-7461-1	Condenser	2.20
BG-5239	Bushing	.30	10-12036Y	Cylinder	1.10
CL-5248	Coil	13.60	10-12846W	Adapter	1.65
IN-5255	Breaker	11.50	10-18555	Block	3.30
GE-5286	Coupling	2.25	10-25858Y	Housing	36.52
GE-5298	Gear	1.13	10-28125	Distributor	48.83
HG-52174	Housing	20.50	10-28716	Ventilator	.79
DP-52300	Block	11.50	10-29217	Oil Seal	3.80

Send for catalog listing complete stock of American-Bosch and Scintilla Magneto and Ignition parts

The above items are offered subject to prior sale F.O.B. Flushing, New York

Distributors of
WILLARD BATTERIES
and Accessories

SYLVANIA RADIO TUBES
Available at
Maximum Wholesale Discounts

EXPORTERS
AIRCRAFT·ENGINES
COMPONENTS

FRANK AMBROSE AVIATION COMPANY

AUTHORIZED AGENT FOR WAR ASSETS ADMINISTRATION
39-01 MAIN STREET, FLUSHING, L. I., N. Y. . . . *Cable Address:* AIRAMBROSE
Branch Warehouse: Oakland Municipal Airport, Oakland, Calif.
Agents for Frank Ambrose Aviation (Canada) Ltd., Dorval Airport, Montreal, Canada
and Frank Ambrose Aviation, S. A., Panama City, R. P.

Established 1923 U. S. Export License No. 191

Rate Wars Again Hit Alaskan Route

Uncertificated lines also troubled by tightened Government regulations.

Recent rate wars, coming on top of stricter enforcement of Government regulations, have pushed a sizeable number of uncertificated Alaskan air carriers onto the ropes, and indications are that some of the companies will be unable to make a comeback.

Two principal trouble spots stand out. One is the highly-competitive route between Northwestern U. S. and Alaska over which between 10 and 15 uncertificated carriers are operating on a supposedly irregular basis under the nonscheduled exemption (section 292.1 of CAB's economic regulations). The other difficulty involves between 30 and 40 uncertificated lines operating with uncertain legal status over routes entirely within Alaska.

► **Fight To The Finish**—Some of the irregular operators flying the Alaska-Seattle route trace the most recent rate war to scheduled intra-Alaska air carriers, one of which has been quoted as saying it would put the "bucket-liners" out of business "even if it takes half a million dollars." Jack Scavenius, president of noncertificated Mt. McKinley Airways, has charged that several airlines which have CAB authorization to operate on schedule within Alaska are engaging in numerous nonscheduled flights to the U. S., often at a heavy loss, in order to beat down competition.

A maritime strike last fall brought new nonscheduled carriers to the Seattle-Alaska route with a rush, and many of the operators continued in business after the tieup ended and business returned to normal. Big problem for the outfits flying cargo and passengers to Alaska is to get a payload on the backhaul. With only a little South-bound freight available, a passenger rate war has developed.

► **Fares Tumble**—A year ago, Mt. McKinley Airways' one-way fare by C-47 from Anchorage to Seattle was $126.50. By early this spring, the price charged by a number of nonscheduled lines had skidded to $80. Then a non-operating company, which the irregular carriers believed was cooperating closely with a large certificated intra-Alaska line, advertised a rate of $59.50, tax included. Seven irregular carriers replied by dropping their one-way fare to $57.50, but losses forced them back up to $70.

Certificated intra-Alaska carriers believe the nonscheduled lines operating exclusively on the Alaska-U. S. route are flying with a frequency that places them in violation of CAB regulations. Curiously, Pan American Airways and Northwest Airlines, the only two carriers certificated to operate between the U. S. and Alaska on schedule, apparently are on the sidelines in the current uproar.

► **Difficulties Inside Alaska**—Meanwhile, a large number of operations started since the war and conducted entirely within Alaska are watching storm signals. Although claiming to be charter or contract carriers, these companies have often been accused of offering common carrier service.

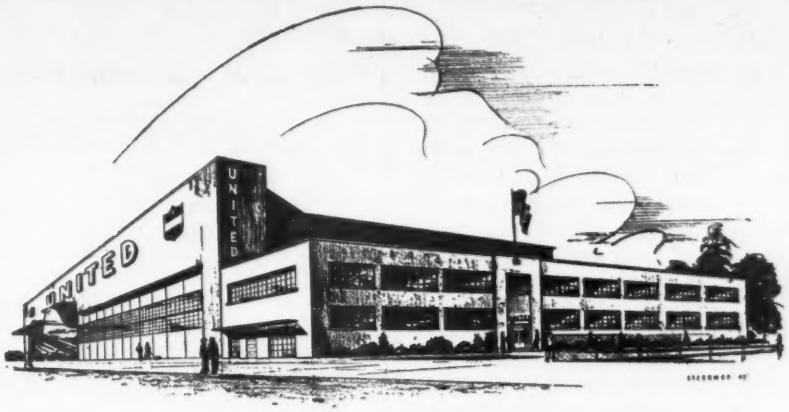
Section 292.1 of CAB's Economic Regulations, which permits nonscheduled lines to operate as common carriers within the U. S. or between the U. S. and Alaska, does not apply to intra-Alaska services. Instead, all common carriers, scheduled or nonscheduled, operating within the territory must have either a certificate of public convenience and necessity or come under a general temporary exemption issued in July, 1945, or specific exemptions issued in 1946.

► **Safety Regulation**—No carrier which started operations after Dec., 1945, has been given an exemption, and many of these newcomers are now in trouble. Last summer, CAB promulgated part 42 of the Civil Air Regulations requiring all nonscheduled companies to obtain an air carrier operating certificate from CAA showing compliance with certain safety standards. In an effort to prevent hardship, CAA did not enforce part 42 as strictly as possible for almost a year.

Now CAA has denied air carrier operating certificates to 18 Alaskan companies which are flying without either certificates of public convenience and necessity or exemptions issued by CAB. In the future, these lines either will have to confine themselves exclusively to charter and contract work, get proper CAB authority for common carrier service, or go out of business entirely.

► **Test Case**—Certificated lines within Alaska have long felt that CAB has not been sufficiently diligent in protecting their interests against the encroachment of uncertificated operators. One such certificated company, Alaska Coastal Airlines, recently won a court order prohibiting an uncertificated operator, Alaska Airplane Charter Co., from offering the public a common carrier service without proper authority from CAB. The case was the first of its kind in Alaska, and the precedent set by the court may have far-reaching effects.

CAB has under active consideration the issuance of a new exemption for irregular passenger and freight operations within Alaska. The proposal was made last fall (AVIATION NEWS, Nov. 18) by Raymond W. Stough, director of CAB's Alaska office, who was in Washington early this month to confer with the Board.



NEW UAL HANGAR PLANNED

Architect's sketch of proposed station and hangar facilities for United Air Lines at the Seattle-Tacoma airport near Seattle, Wash., shows the large steel frame hangar which occupies 31,000 sq. ft. Facilities will be provided to accommodate upwards of 500 operation and passenger service department employees and include: maintenance shops, flight kitchen, stock rooms and air freight terminal.

Labor Pact With IAM Signed by Flying Tigers

International Association of Machinists has signed an agreement with the Flying Tiger Line covering 550 employes of the Oakland, Cal., based carrier.

The pact provides for six paid holidays annually, 15-cents-an-hour average wage increases, two weeks' paid vacation and night shift bonuses. Among the new pay rates are: lead inspector, $400 a month; inspector, $350 a month; mechanic, $1.75 an hour; and ground service-men, $1.25 an hour.

CAB SCHEDULE

Sept. 15. Hearing in Chicago Helicopter service case. (Docket 2384 et al.)
Sept. 15. Hearing on Southwest Airways' request for certificate amendment to permit beginning and/or ending trips at points short of terminals. (Docket 2861.)
Sept. 30. Oral argument in Northeast Airlines mail rate case. (Dockets 1932 and 1890.)
Oct. 7. Hearing involving additional Florida area service. (Docket 1668 et al.)
Oct. 15. Hearing on additional service in California-Nevada Area. (Docket 2019 et al.)
Oct. 20. Hearing on Resort Airlines' application to conduct all-expense "sky cruise" operations. Postponed from Oct. 6. (Docket 2377 et al.)
Oct. 20. Hearing on Pan American Airways' application for route consolidations and extensions in Latin America. (Docket 2811.)
Nov. 15. Hearing on board's investigation of consolidated airfreight tariff agreement. (Docket 2719.)

Protection Sought In Crash Landings

The entire problem of protecting passengers and crew members in crash landings is being reviewed thoroughly by CAB's Safety Rules division, which has decided to go far beyond a recent proposal to increase the strength of safety belts in transport planes.

In addition to higher standards for safety belts, the Safety Rules division is studying the advisability of more stringent requirements for the seats themselves and the structure to which they are attached so that they will be able to withstand more load under emergency conditions. Provision for shoulder harnesses for pilots and co-pilots and use of rear-facing passenger seats are being considered in accordance with last month's suggestions by the President's special board of inquiry on air safety.

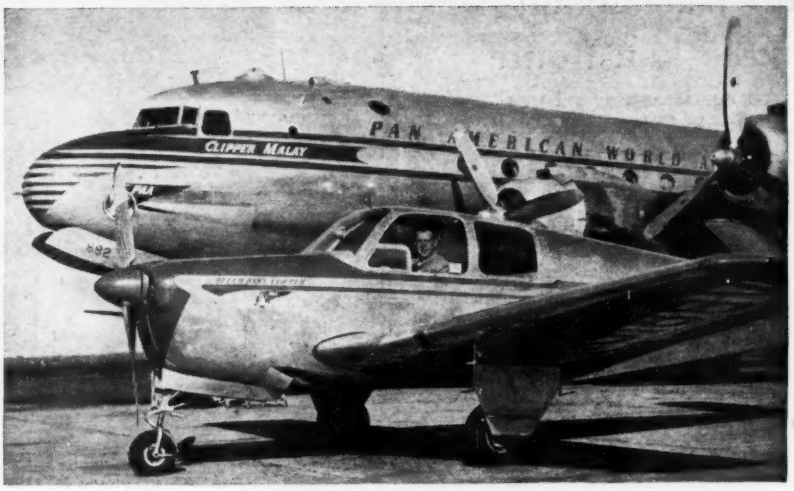
▶ **Passenger Reaction**—Aft-facing seats have been regarded unfavorably by the airlines in the past because of the psychological effect on the average passenger. But it has been recognized that this arrangement provides the greatest degree of safety in the event of emergency landing. Moreover, surveys made by the Army Air Transport Command over a seven-month period have disclosed 94 percent of those using the aft-facing arrangement favored it for its safety factor.

Medical findings over a long period have indicated the desirability of providing full body support for persons experiencing the accelerations resulting from crash landings. It has been demonstrated that in plane accidents involving craft with conventional forward-facing seats the body normally is jackknifed so that the head may be subjected to violent injury at the moment of impact.

▶ **Accident Study**—Need for strengthening seats and the structure to which they are attached has been pointed up in several accidents during the past year. Testimony on the United Air Lines crash at LaGuardia Field last spring disclosed that every seat but the stewardess' was torn from the floor, and the passengers had been violently thrown against the legs of other overturned seats.

In the American Airlines accident at Michigan City, Ind., last December, there were both seat attachment and belt failures. All belt failures occurred in the attaching hardware. While no passengers were killed in this accident, both the pilot and co-pilot were fatally injured when they were thrown into the forward wreckage as a result of failure by their seat attachments.

Pilot and co-pilot were found still in their seats with belts fastened and intact, but the men had suffered severe head injuries and lacerations, apparently from striking the instrument panel and the overhead structure and windshields. The nonfatal American Airlines emergency landing at Jones Beach, Long Island, N. Y., last January also resulted in passenger injuries through belt and seat failures, while the co-pilot was injured when thrown into the instrument panel.



WOLFE AND BONANZA

Thomas Wolfe, vice president in charge of the Pacific-Alaska division of Pan American World Airways, is shown with his newly-purchased Beech Bonanza. The plane will be used for executive travel on the Pacific Coast.

New Slash Planned In Airfreight Rates

Three lines, American, United, PCA, file tariffs which bring rates below present mark.

With the price of almost every other transportation service bounding upward, three certificated carriers—American, United and Capital (PCA)—have filed new airfreight tariffs which would bring their rates on a wide variety of commodities down to 12 cents a ton mile on Oct. 5.

The move is a direct challenge to the uncertificated all-cargo lines which are now charging between 12 and 12½ cents a ton mile for their newly-authorized common carrier services. There is every indication that both the uncertificated airfreighters and the airfreight forwarders, who are being shunned by the certificated lines, will contest the proposed new tariff with CAB and carry their case to Congress if necessary.

▶ **Commodities Listed**—Nineteen certificated airlines, including American, United and PCA, slashed their cargo rates 25 percent on Aug. 1 so that charges currently range between 14 and 21 cents a ton mile. Commodities listed for the new 12 cents a ton mile rate include agricultural products, flowers, aircraft and automobile parts or accessories, wearing apparel, dry goods, electrical appliances and parts, film, machine parts, drugs and pharmaceuticals.

Illustrative of the radical reduction now in prospect is United's proposal to move 3,000 lb. from coast to coast for $477 instead of $750 under the current tariff. A 100 lb. shipment from New York to Chicago would cost $5 against the present $8. On shipments below 1,000 lb., United, American and PCA would undercut the major uncertificated all-cargo lines and probably will be able to divert considerable traffic from railway express.

▶ **Uncertificated Lines Protest**—The uncertificated all-cargo lines believe the certificated carriers should not be permitted to file lower freight rates in view of their charges for hauling passengers and mail. They point out that PCA has been getting several dollars per ton mile for flying mail and the equivalent of 50 cents a ton mile for passengers.

How, they inquire, when PCA is losing money charging these rates for mail and passengers can it ask only 12 cents a ton mile for freight? Both American and United get 45 cents a ton mile for mail and the equivalent of 50 cents a ton mile for passengers.

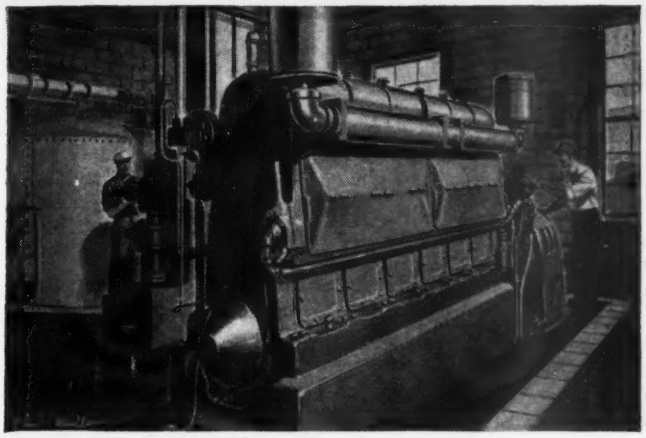
The uncertificated carriers allege that the certificated lines are using their airmail payments to subsidize freight operations and put the independents out of business.

Training Program Set

Engineers and technicians from six airlines will study electronic controls used on the Boeing Stratocruiser and Martin 3-0-3 at a school to be conducted by the Minneapolis-Honeywell Regulator Co. beginning Sept. 29. Attending the training program, which will include familiarization, maintenance and repair studies of electronic fuel gauges and turbosupercharger control systems, will be representatives from Northwest Airlines, BOAC, Scandinavian Airlines System, United Air Lines, Pan American Airways and American Overseas Airlines.

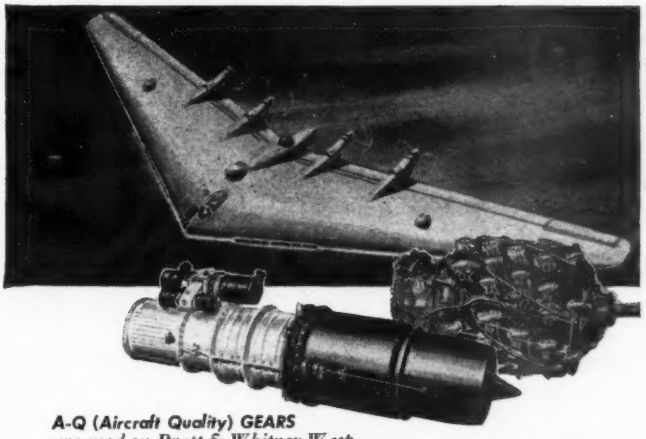
Florida Expansion

Florida Airways, which operates the nation's smallest certificated feeder system, contemplates the purchase of six 20-passenger Beech model 34 aircraft if successful in its application for service to 16 additional Florida cities.

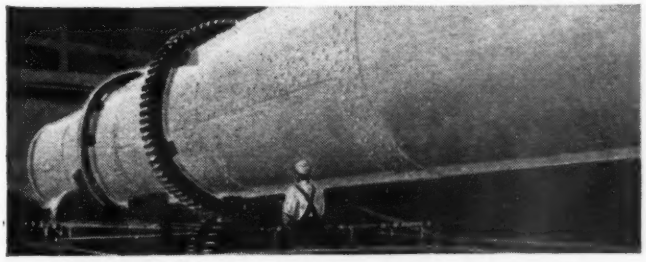


INDUSTRIAL GEARS. *High quality spur, helical, worm and bevel gears to meet practically any requirement.*

ACTUATORS AND POWER UNITS *assure control from a remote point. Used on many of the most modern airplanes they may aid in solving your control problems.*

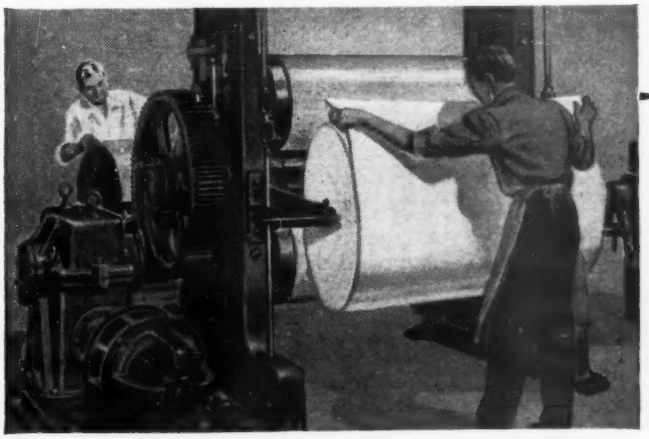


A-Q (Aircraft Quality) GEARS
are used on Pratt & Whitney Wasp Major engines, jet propulsion engines and for many other applications.



GIANT GEARS. *Complete facilities to produce gears up to 20 feet in diameter for sugar mills, cement kilns and other uses.*

SPEED REDUCERS. *A wide variety of sizes and ratios in helical and worm gear reducers to meet every industrial need.*



if you transmit power call on FOOTE BROS.

Regardless of the problem you face in production or transmission of power, Foote Bros. engineers can help you find a solution.

It may be gears—spur, worm, helical or bevel—for machine tools, road building machinery, tractor transmissions, diesel engines, or practically any application. *Foote Bros. produces high quality gears in any quantity to meet any need.*

It may be "A-Q" (aircraft quality) gears for use in applications where the characteristics of high speed, greater compactness, light weight, high efficiency, and low noise level are important. *Foote Bros. A-Q gears closely approach theoretical perfection.*

It may be accessory drives on jet propulsion engines, actuators to provide exact control of linear or rotary motion from a remote point. *Foote Bros. actuators and power units are serving on many of the nation's revolutionary aircraft engines and airplanes.*

It may be speed reducers for a paper mill, a steel plant, a chemical plant or any other industrial application. *Foote Bros. makes reducers in a wide range of sizes and ratios to meet your requirements.*

To manufacturers, Foote Bros. offers two completely equipped plants—nearly a century of manufacturing experience—a thoroughly staffed engineering department to assist in the design and application of equipment to meet any power transmission problem.

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. AVN 4545 S. Western Boulevard • Chicago 9, Illinois
Three bulletins on Foote Bros. products are available. Check the coupon for the ones you are interested in.

☐ FOLDER "WHATEVER YOUR NEEDS IN GEARS"
☐ BULLETIN "AIRCRAFT QUALITY GEARS"
☐ BULLETIN "FOOTE BROS. POWER UNIT"

Name.....

Address.....

City.....*State*.....

New Local Service Proposals Snagged

Two feederlines among the five designated for certification by CAB contingent on a showing of adequate airports along their routes have found the Board reluctant to give the green light for inauguration of service.

Wisconsin Central Airlines, designated for certification in CAB's North Central Area decision last December, applied for its certificate on June 27, and was still waiting early last week. Piedmont Aviation, designated for certification in the Southeastern States Area case decision in April, filed for its certificate a month ago and has been taking punishment ever since.

▶ **Expense Incurred**—Both carriers have reported incurring considerable pre-inauguration expense, including the acquisition of planes, in anticipation of prompt CAB action on their petitions. While Wisconsin Central is still hopeful of getting a go-ahead signal shortly, Civil Aeronautics Board has officially postponed action on Piedmont's bid.

The Board said petitions for reconsideration of the decision authorizing a certificate for Piedmont are still to be acted upon. It also pointed out that State Airlines has filed with the District of Columbia Court of Appeals a request for review of the Southeastern Area Decision insofar as it granted Piedmont routes requested by State.

▶ **Eastern Protests**—State Airlines has told CAB that Piedmont went ahead with its plans for acquiring equipment after the court action was instituted and regardless of its knowledge that the Board is still considering petitions for review of the Southeastern Area decision. Meanwhile, Eastern Air Lines jumped on Piedmont with an assertion that the company actually was planning to start a conventional trunkline operation between the most important cities on its designated routes.

EAL said Piedmont's initial service would bring air service to only four cities for the first time, adding that these points had an aggregate population of only 45,970. "If Piedmont were to operate two roundtrips daily and receive 45 cents a plane mile mail compensation, the public would pay about $1,116,900 annually to subsidize a wasteful, extravagant and unneeded experiment," Eastern asserted.

ATA Hits REA

The Air Transport Association is strongly opposing Railway Express Agency's request for CAB authorization to ship cargo over uncertificated airfreight lines.

ATA, in a brief to the Board, warned against expanding REA's participation in air transportation "at a time when the wisdom of continuing its present degree of participation is in question. The class of traffic in which there is great airfreight potential is that which now moves as railway express. The railroad owners of REA would not encourage or permit REA to work vigorously to accomplish this diversion from the rails."

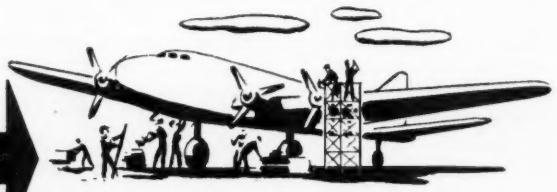
For years, ATA asserted, the airlines have prodded REA to improve and increase service with small success. "Instead, REA has frustrated joint promotional committees and campaigns which the airlines established."

PCA Shows Loss

Capital Airlines (PCA) had an operating profit of $19,549 and a net loss of $196,657 during the second quarter of 1947, compared with a $2,331,960 net loss in the first quarter, according to revised figures. Operating expenses in the second quarter were $111,000 less than in the first quarter despite an increase in traffic. Passenger business during the latter part of August and early September showed marked improvement over figures reflecting early-summer levels.

Safety in the air

BEGINS ON THE GROUND



. . . protect your equipment and personnel with non-sparking, non-magnetic Ampco Safety Tools

Ampco Safety Tools are approved by Factory Mutual Laboratories and other safety authorities for use amidst hazardous gases, dust, and explosive fumes. These tools have exceptional strength and wearing qualities. They are non-corrosive . . . rustless.

Ampco's 500 standard types and styles of safety tools are widely used on air fields, on shipboard, in oil refineries, chemical plants, mines, etc. Keep your maintenance crew morale high; equip your men with Ampco Safety Tools. Write for latest Safety Tool Catalog — it helps you select the right tools for your job. *Ampco Metal, Inc., Dept. AW-9, Milwaukee 4, Wisconsin.*

AMPCO safety tools

AA-14

In Canada, contact Safety Supply Company, Toronto

SHORTLINES

▶ **American**—Established a new all-time passenger traffic record in the New York area during August. Company flew 70,021 persons out of LaGuardia field and Newark airport to beat the previous record of 67,239 passengers set in Aug., 1946. August load factors out of New York were 8 percent above July.

▶ **American Overseas**—Made its 15,000th trans-Atlantic crossing early this month. The trips, covering a five-year period, include the regularly-scheduled AOA passenger flights plus military and naval contract operations conducted during the war. On commercial flights alone, AOA has carried 90,195 passengers and nearly 5,000,000 lb. of cargo and mail. Company is operating 24 round-trips weekly to Europe with seven Constellations and eleven DC-4s.

▶ **Braniff**—Has signed a contract with Maxson Frozen Food Corp. for "Skyplate" in-flight meals when the carrier opens its Latin American service this fall.

▶ **Capital**—Will fly seven college football teams and two professional elevens to games in all parts of the country this fall.

▶ **Continental**—Is pointing out to its passengers flying between Alburquerque and El Paso that Alamogordo Desert area where the first atomic bomb was detonated.

▶ **KLM**—After 27 years of operations to Croydon airport has transferred its London services to London (Heathrow) airport.

▶ **Mid-Continent**—Has begun a system-wide drive for first-rider business.

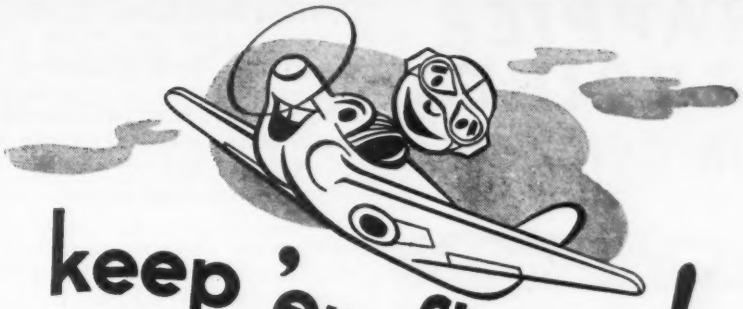
▶ **National**—Recently launched a system-wide reorganization and enlargement of its security and fire prevention division. James H. Hart has been appointed security and fire prevention engineer.

▶ **Northwest**—On Sept. 1 marked the first anniversary of its service to Anchorage—first steps in developing its international operations. During the, year NWA flew 14,661 revenue passengers on Alaska flights, 434,-929 lb. of mail, 120,342 lb. of express and 214,515 lb. of freight.

▶ **Pan American**—During the week ended Aug. 23 established a new record for trans-Pacific air travel by carrying more than 1,500 revenue passengers to and from Honolulu.

Peruvian International—Since beginning operations last spring has signed interline agreements with American Airlines, American Overseas, Pan American, KLM, Chicago & Southern, National, Delta, Trans-Canada, Scandinavian Airlines System, Air France, TACA and Eastern. Company hopes to begin flights to the U. S. shortly.

▶ **TWA**—Is moving several international division offices and departments from 521 Fifth Ave., New York, to New Castle County airport, Wilmington, Del....Company has inaugurated direct nonstop service from Washington to Cincinnati.



keep 'em flying!

• PROPELLERS
• GOVERNORS
• BLADES • ENGINE ACCESSORIES

Overhaul Parts for Engines and Accessories

LARGE STOCKS ON HAND

WE INVITE YOUR INQUIRIES

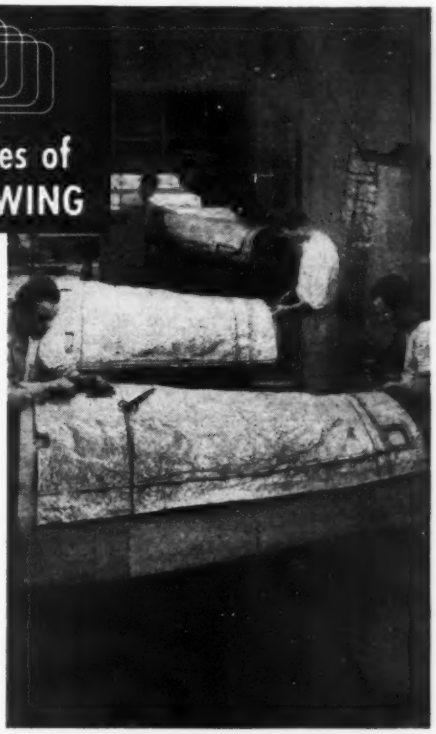
→ PHONE • WIRE • WRITE TODAY ←

Aircraft Components Corporation

HOME OFFICE: 602 Montgomery Street, Alexandria, Virginia. Phone OVerlook 2100

REFRASIL

Blankets for Jet Engines of NORTHROP FLYING WING



Refrasil our 2000° F. insulating material has been specified for the tail cones and tail pipes of the General Electric TG-180 turbojets which power the new YB-49 Northrop Flying Wing. Refrasil blankets, complete with foil, mesh reinforcement and fittings, are prefabricated on forms in our plant and are delivered finished and ready to install. Ease of installation, removal or replacement are added advantages of Thompson *prefabricated* Refrasil blankets.

Refrasil is also supplied in batt, cloth, sleeving, cordage and tape forms.

Information and samples of Refrasil on request.

THE H. I. THOMPSON CO.
Section 11-9 1733 Cordova St.
Los Angeles 7, Calif.

HAPPIER LANDINGS IN CHICAGO

AT

Skymotive INC.

ON

Chicago's New

PUBLIC AIRPORT

35 Minutes from the Loop

CHICAGO ORCHARD

(Douglas)

Includes:

- Four 6000-foot Concrete Runways
- CAA Control Tower (Orchard Tower 332 KC)
- The Best Runway Lighting—Approach Lights—
- Weather Facilities
- I. L. S. now operating

Skymotive Service INCLUDES

—CAA APPROVED REPAIR STATION NO. 3712

—RADIO REPAIR
Bendix products
Aircraft Radio Corp. V. H. F.

—HELICOPTER Maintenance

—HANGAR SERVICE

—COMPLETE Line of SHELL products

—STATION WAGON SERVICE to and from Downtown

Phone—CHICAGO NEWCASTLE 4311

A collect call or wire will alert us for any special needs.

SKYMOTIVE

DOUGLAS AIRPORT • NORTHWEST CHICAGO

Jack Henebry, Gen. Mgr. - Phil Cochran, Pub. Rel.
Box 448, Wolf Road and Bryn Mawr Ave.
Park Ridge, Illinois

Nonscheduled Lines Facing New Ban

Nonscheduled passenger transportation to foreign points was slated to take the ax from CAB last week as a number of uncertificated carriers frantically sought a stay of execution.

When the Board revised the nonscheduled exemption (section 292.1 of the Economic Regulations) last June 10, it authorized indefinite continuance of nonscheduled domestic and overseas transportation, the latter including flights to Hawaii, Alaska and Puerto Rico. But CAB said substantial extension of this country's certificated international air transportation system, together with the award of numerous foreign air carrier permits, had made it advisable to terminate on Sept. 10 the exemption for irregular passenger-carrying flights to foreign points.

▶ **Extension Sought**—A number of petitions for a three to six month extension of the Sept. 10 deadline were received by CAB early this month, and more were expected. The requests came not only from carriers using large equipment for flights to Europe, Asia and South America but also from small fixed base operators which have been taking U. S. sportsmen to Canadian fishing and hunting areas.

▶ **Backhaul Problem**—Airfreight is, now available in considerable quantities for the run from the U. S. to foreign points, but because of general scarcities of commodities abroad there is little chance of picking up a profitable load of cargo on the backhaul. Carriage of passengers to make the overall operation financially successful is still necessary, TAL declared, adding that without this privilege a number of U. S. irregular carriers presently engaged in foreign transportation of both passengers and cargo face extinction.

Transocean has been operating from its Oakland, Cal., base to the Philippines and the Far East and between New York, Europe and the Middle East. Other companies asking CAB to extend its exemption are Trans Caribbean Air Cargo Lines, New York, flying from New York to Europe and the Near East with five DC-4s; Skyways International Trading and Transport Co., Miami, operating to Latin America, Europe and the Middle East with two Lodestars, two DC-3s, one C-46 and one Sikorsky S-44.

Other industry developments:

Slick Airways, San Antonio, flew 22,525,408 revenue ton miles of freight between March, 1946, and July 31, 1947, when it closed its books as a contract operator and became a common carrier. July total was 1,547,808 ton miles.

Bonanza Airlines, Las Vegas, Nev., and Arizona Airways, Phoenix, Ariz., have called off plans for merger of the two intrastate systems (AVIATION NEWS, June 30).

Winged America Airlines, Philadelphia, Pa., has asked CAB for a certificate to operate from New York and Philadelphia to Nassau, Bahama Islands. Company operates four DC-3s.

HOSE FOR USE IN ANY INDUSTRY!

Light, Strong, Flexible

FLEXAUST

SPIRAL-REINFORCED HOSE

Flexaust is suitable for a wide variety of suction and pressure uses in ventilation, dust collection and fume control. **SIZES 1¼ inches to 24 inches.** Write for full information on this all-purpose hose. Various Flexaust types, accessories, and other hose types also available:

BLOFLEX
Non-reinforced collapsible

PORTOVENT
Ring-reinforced retractable

AMERICAN VENTILATING HOSE COMPANY

Dept. A4, 15 Park Row, New York 7, N. Y.

Branch Offices: New Orleans, La., San Francisco, Calif., Washington, D. C.

Plants: Amesbury, Mass. • Seattle, Wash.

Books that tell you how—

Flight Testing

Conventional and Jet-propelled Airplanes
By Benson Hamlin

The first complete systematization of methods for deriving and analyzing flight-test data for all types of airplanes—jet-propelled as well as propeller-driven. All terms and symbols are standardized. All essential theory is explained. 12 large charts simplify calculations, and there are many reference tables. Written by an engineer who has worked in the flight-test sections of five leading aircraft concerns. $5.00

Aircraft Drafting

By H. H. Katz

Written by an engineer who has trained hundreds of draftsmen for Republic and Consolidated-Vultee, this book offers a thorough preparation for professional work in the aircraft drafting room. All basic drafting techniques and their special applications to aircraft are clearly explained. In addition, there is much information on lofting, weight calculations, materials, standard parts, bills of materials and other engineering and production procedures. Over 1000 large, clear drawings, and practice problems. $5.00

Aerodynamics

By L. R. Parkinson

A brief, simply written explanation of all basic principles, including much useful data on airfoils, stability, flight tests and wind tunnels. A handy guide for all those in design, engineering and testing departments. Illus. $2.25

Send for on-approval copies

MACMILLAN • 60 Fifth Ave., N. Y. 11

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • PLANES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE

60¢ a line, minimum 4 lines. To figure advance payment count 6 average words as a line.

POSITIONS WANTED (full or part-time individual salaried employment only), ½ above rates.

PROPOSALS 75¢ a line an insertion.

INFORMATION

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPAYED RATE:

The advertising rate is $9.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received Friday will appear in the issue dated second Monday following subject to limitation of space available

WANTED

Experienced Aircraft or Electrical Engineer—to work with customers' engineers on selection, design, application and installation of a proposed product or system, mechanisms and/or equipment. Minimum 5 years experience in Aircraft Engineering Department. Also needed—Mechanical Design Engineer—experienced in design of small electro-mechanical mechanisms.

LEAR, INCORPORATED
GRAND RAPIDS, MICHIGAN

POSITIONS VACANT

DESIGNER 3 to 6 years experience in aircraft engine accessories, such as manifold pressure controls or carburetors. Prefer age under 30. Give full details on education, experience and previous positions. Personnel Dept., The Bristol Company, Waterbury 91, Conn.

B.S. in E.E. or Physics, 3 to 6 years experience in electronic circuit design (no radio). Ultimate responsibility development of electronic instruments and controls for aircraft. Prefer age under 30. Give full details on education, experience and previous positions. The Bristol Company, Personnel Department, Waterbury 91, Connecticut.

SELLING OPPORTUNITY OFFERED

SALES AGENCY—An opportunity to build a business of your own under the direction of a national aviation sales organization. Unusually high earnings possible (Upwards of $1000 per month). You must have sales ability, be willing to work hard and sincerely believe in the future of aviation. Sale of planes or equipment not involved. Five to ten thousand dollars required depending on the territory. A knowledge of aviation is helpful but you must not now be a flight operator. Only one appointment open from each non-competitive market area. Give full particulars of your background and how you can be reached by telephone to arrange a preliminary interview. National Flight System, Suite 1112-A, 610 So. Broadway, Los Angeles 14, Calif.

POSITIONS WANTED

AIRCRAFT SALES or administrative position; Experienced in export procedure; reassembly; demonstrating; flight testing; instructor; former Navy Lt. Comdr. Squadron C.O., B.S. Business administration, age 33, available immediately. Louis Tobia, 156 Kilburn Road South, Garden City, N. Y. Hempstead 2652R.

FORMER FLIGHT engineer, ground school instructor, private pilot, licensed A&E, feeder airlines maintenance supervisor, desires responsible aviation position. Available immediately. PW-1865, Aviation Week, 320 W. 42nd St., New York 18, N. Y.

ENGINEER-PILOT, over 2 yrs. college, 2 yrs. civil engineering experience, 1½ years aeronautical engineering experience, 5 yrs. flying experience, 2600 hrs; commercial pilot, single and multi-engine land, instrument and instructor ratings. Desires either engineering or piloting position anywhere in continental U.S. PW-1945, Aviation Week, 520 N. Michigan Ave., Chicago 11, Ill.

OFFICE SPACE AVAILABLE

On Lockheed Air Terminal, near Los Angeles

These choice offices are located in Pacific Airmotive Corporation hangars directly on Lockheed Air Terminal, and are accessible by car, airplane, and public transportation.

Inside and outside parking facilities for aircraft are also available, as well as 24-hour service and complete repair, overhaul, and aeronautical supplies.

The location is ideal for out-of-town firms desiring convenient field offices in the vicinity of Los Angeles. Immediate occupancy. For complete information, write our Customer Service Dept., or call STanley 7-2781, Ext. 10.

PACIFIC AIRMOTIVE CORPORATION

2940 N. Hollywood Way
Burbank, California

PAC

POSITIONS WANTED

IF YOU are looking for a superior company pilot, investigate this. Airline transport rating, all types of equipment. Age 29, married. PW-1772. Aviation Week, 68 Post Street, San Francisco 4, Cal.

FOR SALE

One 1946 "Bellanca"

4 passenger 150 HP goes to best offer, approximately 75 hrs in the air, all instruments including two-way radio, in wreck, landing gear, wings and prop damaged, estimated repairs $1,250.00 by responsible company name can be furnished. Fireproof Storage and Van Co., Knoxville, Tenn.

Beechcraft-D178

with 450 PW engine. Licensed 5 place and 125 pounds baggage. 700 hours on aircraft and engine since new. Upholstered with airfoam rubber and matched Bridgeport Fabrics. 32 coat hand rubbed white finish with maroon metallic trim in standard Beech design. Licensed night instrument. Best offer over $8000.00 buys it. Southwestern Airways, Box 315 Oklahoma City, Okla. Phone 9-5590.

Lockheed Lodestar

Executive transportation for discriminating owners. Plane ready for your person interior arrangements. Trades considered. Matt Tainio, 1311 W. 157th St., Apt. C, Gardena, Calif. Phone Menlo 4-4474.

— SCHOOLS —

Rising Sun SCHOOL OF AERONAUTICS
ESTABLISHED 1930
"Built Upon the Success of It's Graduates"
GOVT. C.A.A. and VETERAN APPROVED
ENROLL NOW FOR NEXT CLASS
2206-16 E. HUNTINGTON ST., PHILA., PA.

EXECUTIVE AVAILABLE

I am interested in going to work for an organization that has an assignment for a man with the following qualifications:

- **Graduate engineer, electrical, formerly vice-president and chief engineer for nationally known electrical components manufacturer for a period of twelve years.**
- **Simultaneously organized and operated for the past fourteen years the largest fixed base aircraft service operation and shops in the Northeast United States, employing over 300 people.**
- **Can furnish excellent references attesting to outstanding ability as an organizer, promotional and sales. Very capable public speaker.**
- **Twenty years of thorough aviation experience and holds current ratings as Airline Transport Pilot, Multi-engine 220-3150 H.P., Commercial with single and multi-engine land and sea, instrument and instructor and all around instructor ratings.**
- **Age 44, married, excellent physical condition and ready for immediate assignment.**

PW-1969, Aviation Week
520 North Michigan Ave., Chicago 11, Ill.

DICK POWELL'S
National Flight System

A few select distributorships available for live-wire able to manage own business backed by national organization. Must be financially capable, qualified to hire and train salesman and conduct advertising campaigns. Exceptional profits. Sale of planes and equipment not involved. $5,000-$10,000 required. Write to 6331 Hollywood Blvd., Hollywood, Calif.

1830-92's

New 1830-65's Converted to 1830-92's.....$3,500.00
Newly Overhauled 1830-65's Converted to 1830-92's and Approved for Scheduled Operations.....$2,750.00
1830-92's Newly Overhauled by Army.....$1,900.00
1830-65's Newly Overhauled by Army, Converted to 1830-92's.....$1,750.00

Parts For R-2000-7's & R-1830-92's. All parts & Engines Packaged for Long Time Storage & Export.

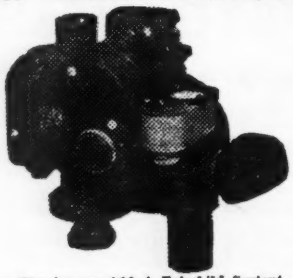
MEMO: We are handling increasing quantities and types of engines and engine parts. Rapid inventory changes prevent keeping up with our stock in these ads. For your greatest advantage we strongly recommend that you

KEEP US INFORMED OF YOUR NEEDS

STEWARD-DAVIS COMPANY, 13501 S. Western Avenue, Gardena, Calif.

CABLE: STEDAV. Phone: Plymouth 5-5144 or MEnlo 4-4579

$300. NAVIGATOR'S SEXTANT ONLY $17.50!



The famous A10-A Fairchild Sextant

This fine instrument is ideal for surface and air navigation; it uses the artificial horizon bubble and the automatic averaging device which alone increases precision and speed in observations several hundred percent over other types. We furnish this fine instrument complete with fine grain wood carrying case (lock type), hanging bracket, battery case (for night shots), wrench, free Army Tech. manual on Celestial navigation and if you want it, the extra power telescopic attachment. Please mention the telescope when ordering, however. Slightly used, the price is only $17.50.

We also offer Link A12 Sextants.....$17.50
Bausch & Lomb A8A Sextants.....$32.50

Quantity discounts available to dealers and exporters.

Pilot's sun glasses, metal rimmed, gold plated, green, with case..... $4.95
Pilot's flying goggles, clear lense, metal rims, rubber mold..... $4.95
Radio headphones, AAF type..... $1.95
Radio Hand michrophones, Type T-17..... $2.95
Helmet, cloth, with radio headphones, rubber ear cups, both for..... $3.75
ADF (Radio Direction Finder, Automatic), SCR269F, brand new, complete including 24 volt inverter, f.o.b.....$150.00

AERO PARTS SUPPLY
Dept AW, Municipal Airport, Houston, Texas

DC-3's—C-47's
Licensed. Ready to Go.
Cargo or Passenger. Good Selection. Many Spare Parts.
$20,000 —— $29,000
Available for Inspection at
CONKLIN AVIATION CORP.
Byrd Airport, Richmond, Va.
Tel. FAirfield-2851

TWIN-ENGINE CESSNA

Twin-engine Cessna and extra newly majored engine. All modifications on ship and engines complied with. Total time under six hundred hours. Complete radio and instruments day or night flying. This airplane must be seen to be appreciated.

$6,250.00 takes ship and extra engine.

Call or Write
DON MARSHALL
Melrose Hotel Dallas, Texas

SEE US FOR APPROVED REPAIR STATION 188

SAE INSTRUMENTS

NEW — USED — ALL TYPES — SALES — REPAIRS

STANDARD AIRCRAFT EQUIPMENT COMPANY
Hangar 35, Roosevelt Field, Mineola, L. I., N. Y. Garden City 8753

EXHAUST COLLECTOR RING ASSEMBLIES
DOUGLAS PART #5115224 (C-47) NEW
JOHN N. HOWARD
P. O. Box 956, Coral Gables, Fla.

FOR SALE
DC3C cargo airplane in unusually excellent condition. 148 hours on P & W 1830-92 engines since new and 1300 hours on airframe. Needle props. Already licensed. Perfect shape. Make offer.
J. R. HARRINGTON
P. O. Box 253 Mansfield, Ohio

New Hamilton Governors
Models: 1A2, 1A4, 1Q12, 4G8 4G10, 4K11 and many others. All packed in original factory cartons. Will ship on approval. Priced far below market. Wire for quotation.
Anderson Aircraft Co.
1700 Sawtelle Blvd.
Los Angeles 25, California

LOCKHEED MODEL 12
Lockheed Model 12, airline radio and instruments. 50 gallons extra gas capacity. Deluxe interior. Ship in perfect shape. Will demonstrate on request. *Call or Write.*
DON MARSHALL
Melrose Hotel Dallas, Texas

If this or other advertising does not supply the information concerning products or services wanted, please write:
AVIATION WEEK
330 W. 42 ST., NEW YORK, N. Y.

---

aircraft tubing | *MILLIONS OF FEET • CARBON & ALLOY*
IMMEDIATE SHIPMENT AT BELOW MILL PRICES
Send us your specifications
WESTCHESTER TUBING CO. Inc. Phone: Mount Vernon 8-2263
P. O. Box 361, Mount Vernon, N. Y.

Orders now being received for November delivery

"AN" STANDARD PARTS BOOKS

Offset Printed: 950 Pages: 2 Volumes: Bound in Post-Binders, Fibre Cover.
"AN" STDS., "NAF" STDS., & "AND" Design Standards.
List Price: Set of 2 Volumes $30.00. Write for quantity discounts.

ORDERS MUST BE PLACED PRIOR TO OCTOBER 10TH, 1947

Money gladly refunded within 10 days if not satisfied

CORYDON M. JOHNSON CO., Inc. *Publishers*, Bethpage, Nassau County, New York

Economy Offers

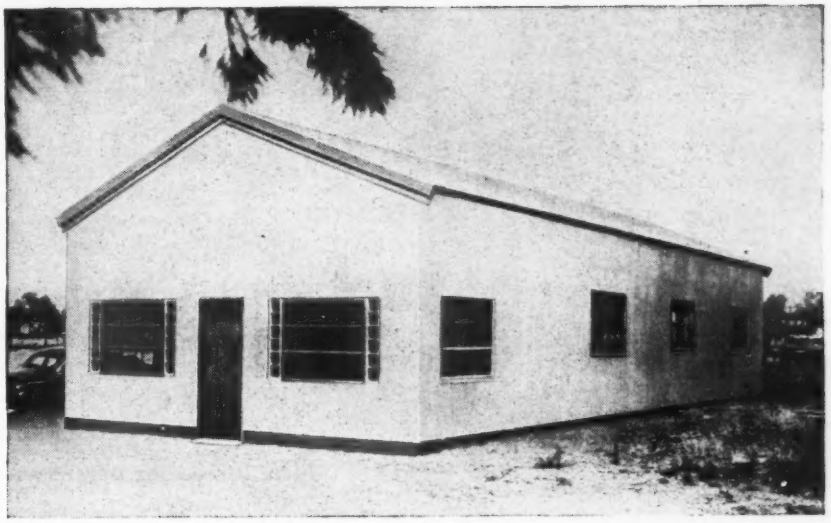
HANGARS
A WIDE SELECTION
OF
STEEL BUILDINGS

THIS IS A PARTIAL LIST ONLY

Write for complete details

STEEL BUILDINGS and HANGARS

Spot Delivery



B-305, 25' x 45'—Three complete buildings, 25' wide by 45' long by 12' at the eaves. Approximately 25' high at the center. Aluminum covered. Three bays 15' each. Equipped with two sliding doors.

B-306—One Airplane Hangar—130'x160'x39' high at the center. The truss is a continuous arch type graduating from a height of 8' at the eaves to 39' at the center.

B-307, Steel Hangar—consists of 176'x200'—completely free of any columns and two wings 21'x200' each. The height of the main building is 19' at the side and rising to 48' in the center. The wings have 13' headroom for the entire length. Both ends of the building are closed by eight sliding steel door panels 20' widex19' high. Complete electric wiring, power panels, switch gears and incandescent lighting fixtures. All plumbing for a steam heating system for the wings is included.

B-308—One all steel private airplane hangar. Structural steel designed for a combined load of 27# per foot. A clear door opening of 41'8". Clear vertical opening 9'. Wing section 42' wide x 16' deep x 13' high. Tail section 14' wide x 13'8" deep x 9' high.

B-309—One all steel small airplane hangar 40'x100'. Equipped with full sliding doors on one end for an opening of 38'5". Building completely covered with steel sheets.

B-400, 40 x 100—Six complete buildings 40' wide by 100' long by 14' to the eaves. 22' high at the center. Aluminum roofing and siding. Equipped with two 10' x 10' sliding doors and four 3' x 5' windows. Complete building ready for erection.

B-401, 50 x 100—Two complete buildings 50' wide by 100' long by 14' to the eaves. 22' high at the center. Aluminum roofing and siding. Doors and windows included.

B-402, 60 x 100—One complete building, 60' wide by 100' long by 19'6" to the eaves. Center height in proportion. Clear span. Completely covered with aluminum roofing and siding. Doors and windows included.

B-403, 70 x 100—One complete building 70' wide by 100' long by 23' high to the eaves. Center height in proportion. Clear span. Complete with aluminum roofing and siding. Doors and windows included.

B-404, 80 x 100—Three complete buildings, 80' wide by 100' long by 14' high to the eaves. Composed of two bays measuring 40' wide each. Each bay has a center height of 22'. Aluminum roofing and siding included. For 10' x 10' sliding doors and four windows 3' x 5' included.

B-405, 120 x 200—Three buildings 120' wide by 200' long by 16' high to the eaves. Composed of three bays measuring 40' wide each. Center height in proportion. Six sliding doors measuring 10' x 10' and located one at each end of each bay are included. Eight windows measuring 3' x 5' are also included.

B-406, 100 x 100—One complete building 100' wide by 100' long by 19'6" composed of two bays measuring 50' wide each. Center height of each bay is in proportion with the eave height. Four sliding doors and four windows are included in the building. Entire structure is covered with corrugated aluminum sheeting.

B-407, 150 x 300—One complete building 150' wide by 300' long by 28' high at the eaves. Composed of 3 bays measuring 50' wide each. Center height of each bay is in proportion with the eave height. Six sliding doors and 12 windows are included. Corrugated aluminum roofing and siding included.

B-408, 120 x 100—One complete building, 120' wide by 100' long. Side wall height 16' to the eaves. Composed of two bays measuring 60' wide each. Four sliding doors measuring 20' x 20' each are included and four sash measuring approximately 3' x 5' are included. Entire building is covered with corrugated aluminum.

B-409, 140 x 180—One complete building 140' wide by 180' long by 28' high to the eaves. Composed of two bays measuring 70' wide each. Building is equipped with four 20' x 20' sliding doors, six steel sash measuring 3' x 5' are included. Aluminum roofing and siding is included.

B-410, 110 x 150—One complete building 110' wide by 150' long—clear span. 16' high at the eaves. Truss type support. Covering and siding included. Doors included.

CRANE RUNWAY

CR-200—1780 lineal feet of crane runway ready for shipment with any of the above buildings. This runway has been made expressly for these buildings and can easily be installed.

OVERHEAD CRANES

A PARTIAL LIST ONLY

2-ton P&H. 31'10¾" Span. Hoist motor 6 HP. Bridge motor 6 HP; trolley 2 HP. 230 Volts DC.

2½-ton P&H. 33' Span. Two 10 HP on Hoist; two 1 HP motors on trolley; one 10 HP on bridge. Current: AC.

3-ton P&H. Span 42'1½". Three motors—8 HP on bridge; 8 HP on hoist; 1½ HP on trolley. Current: 250 Volts DC.

5-ton Detroit. 34' Span. Three motors—7½ HP, 5 HP and 1½ HP. Current: 220 Volts AC.

5-ton P&H high speed crane. Span 72'1". Current: 220 Volts DC. Two 40 HP hoist motors, one 20 HP on bridge; 6 HP on trolley.

5-ton overhead crane. 37'3" Span. Hoist motor 10 HP; trolley 2 HP; Bridge 7½ HP. Current: 440 Volts, 3 phase, 60 cycle.

5-ton Alliance. Span 95' 220 Volts DC. Hoist motor 25 HP; Bridge 50 HP; trolley 15 HP.

10-ton Lane. Span 60'. Two 15 HP motors, one motor operates bridge and hoist, the other the trolley. Current: 230 Volts DC.

15-ton Bedford. Span 34'6". 220 Volts AC.

15-ton overhead crane. 74'4" Span. 3 motors General Electric—30 HP on hoist.

20-ton overhead crane. 60' Span. Four General Electric DC motors.

25-ton overhead crane. 74'4" Span. Four General Electric motors—40 HP on hoist; 15 HP on auxiliary hoist; 15 HP bridge and 5 HP Trolley.

ECONOMY COMPANY, INC.

45 Vanderbilt Ave., N. Y. C. **Tel. MUrray Hill 4-1616**

ORDER YOUR WALTER SNOW FIGHTERS NOW!

CHOOSE WISELY! Snow removal equipment is one of your most important purchases—in terms of cost and community winter safety.

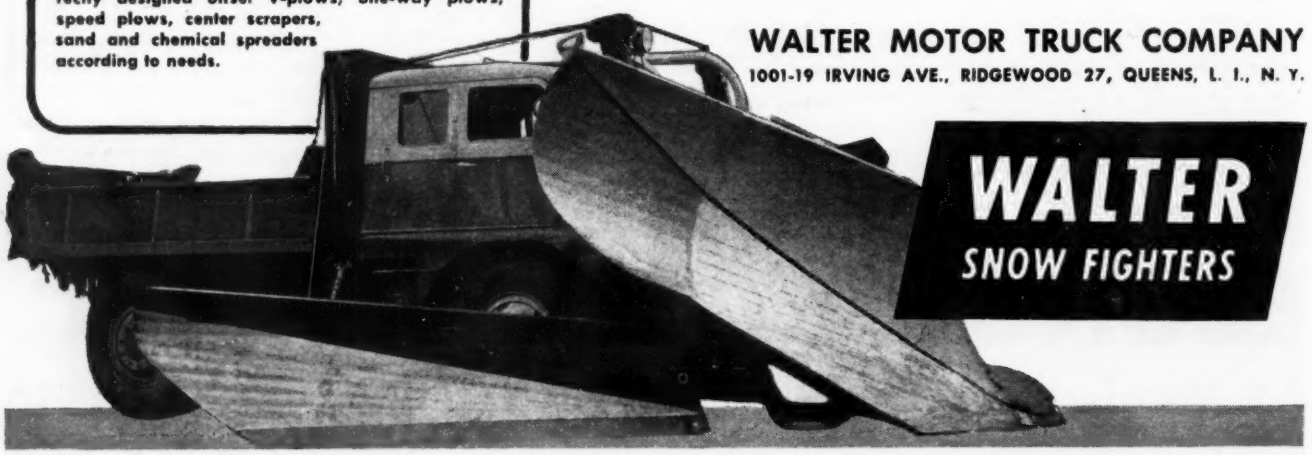
Get the most from your investment by choosing Walter Snow Fighters—the fastest, surest, most thorough snow removal method under all winter conditions. And get the year-'round bonus of Walter's great power and non-slip traction for maintenance and hauling jobs—on or off the road.

ORDER EARLY! The peak demand for Walter Snow Fighters is just ahead. Order NOW and let us schedule your equipment for delivery before snow-time. Your Walter distributor is glad to discuss your needs and explain the many valuable Walter advantages. Detailed literature sent upon request.

Advantages of WALTER SNOW FIGHTERS

- No slipping, stalling or wheel-spinning, because the exclusive 4-Point Positive Drive delivers power to each of four driving wheels according to its traction at any instant.
- Clear 28 foot widths in one run; clear at speeds up to 30 mph.; throw snow far to the side, making widening out easier; buck through deepest drifts.
- Models from 125 to 350 hp., available with correctly designed offset V-plows, one-way plows, speed plows, center scrapers, sand and chemical spreaders according to needs.

WALTER MOTOR TRUCK COMPANY
1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, L. I., N. Y.



ADVERTISERS IN THIS ISSUE

AVIATION WEEK

Sept. 15, 1947

Aeroproducts Div. of General Motors Corp. 38
Agency—Kircher, Helton & Collett, Inc.

Aircraft Components Corp. 55
Agency—Art Ads Advertising Agency

Ambrose Aviation Co., Frank. 50
Agency—Steedle, Rankin & Boyle, Inc.

American Ventilating Hose Div. 56
Agency—Campbell-Ewald Co. of N. Y.

Ampco Metal, Inc. 54
Agency—Hoffman & York, Inc.

Cargocaire Engineering Corp. 56
Agency—Campbell-Ewald Co. of N. Y.

Chicopee Mfg. Corp. 44
Agency—Hanly, Hicks & Montgomery, Inc.

Douglas Aircraft Co., Inc. 3
Agency—J. Walter Thompson Co.

DuPont de Nemours & Co., Inc., E. I. 3rd Cover
Agency—Batten, Barton, Durstine & Osborn Inc.

Enjay Co., Inc. 25
Agency—McCann-Erickson, Inc.

Firestone Aircraft Co. 32, 33
Agency—Sweeney & James Co.

Foote Bros. Gear & Machine Corp. 53
Agency—The Buchen Co.

General Electric Co. (Apparatus Dept.) 4th Cover
Agency—G. M. Basford Co.

Hansen Mfg. Co., The. 34
Agency—Richard T. Brandt, Inc.

Interchemical Corp. 27
Agency—Fuller & Smith & Ross, Inc.

International Nickel Co., Inc., The. 9
Agency—Marschalk & Pratt Co.

Kollsman Instrument Corp. 19
Agency—Erwin, Wasey & Co., Inc.

Macmillan Co., The. 56
Agency—Atherton & Currier, Inc.

McGraw-Hill Book Company. 61

Monsanto Chemical Co. 29
Agency—Gardner Advertising Co.

Nukraft Mfg. Co., Inc. 48
Agency—William Hoffman & Associates

Pacific Airmotive Corp. 46
Agency—West-Marquis, Inc.

Phillips Petroleum Co. 31
Agency—Lambert & Feasley, Inc.

Pratt & Whitney Aircraft. Front Cover
Agency—Platt-Forbes, Inc.

Searchlight Section 57, 58, 59

Simmonds Aerocessories, Inc. 23
Agency—Jones & Brakeley, Inc.

Skymotive Aviation Management Corp. 56
Agency—Swaney, Drake & Bement

Snap-On Tools Corp. 37
Agency—Scott-Telander Advertising Agency

South Bend Lathe Works. 8
Agency—Lamport, Fox, Prell & Dolk, Inc.

Standard Oil Co. of N. J. (Esso). 43
Agency—McCann-Erickson, Inc.

Standard Pressed Steel Co. 10
Agency—R. E. Lovekin Corp.

Steel Improvement & Forge Co., The. 20
Agency—The Lee Donnelly Co.

Superior Tube Co. 8
Agency—Renner Advertisers

Thompson Co., The H. I. 55
Agency—Hixson-O'Donnell Advertising, Inc.

Titeflex, Inc. 4
Agency—Sykes Advertising, Inc.

Waldes Kohinoor, Inc. 41
Agency—Grey Advertising Agency, Inc.

Walter Motor Truck Co. 60
Agency—Thoma & Gill

Westinghouse Electric Corp. 2nd Cover
Agency—Fuller & Smith & Ross, Inc.

Whittaker Co., Ltd., Wm. R. 40
Agency—The McCarty Co.

Wilson, K. R. 5
Agency—Warman & Co.

Wyman-Gordon 6
Agency—John W. Odlin Co., Inc.

■

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT
Positions Vacant 57
Selling Opp. Offered 57
Positions Wanted 57

EDUCATIONAL
Books 58
Schools 57

BUSINESS OPPORTUNITIES
Offered 57

EQUIPMENT
(Used or Surplus New)
For Sale 58-59

Check These
best modern procedures of
airline operation

• New book gives latest facts and figures on the key jobs in commercial aviation

Just Published!

Airline Traffic and Operations

by Morris B. Baker
Industrial Engineer, TWA
442 pages, $4.50

Illustrated

HERE'S a complete, up-to-date survey of America's commercial air transport system that will help you to gain a thorough knowledge and understanding of the various jobs involved in the preparation and completion of a flight. This comprehensive book describes each phase in detail, from ticket sales to proper loading procedures, so that you get a working knowledge of every job and a clear picture of the overall routine. In concise, non-technical language, the book treats the domestic airline system as a whole, dealing with such key functions as dispatching, operations, aircraft repairs, and the handling of air mail and air express, etc. You are told not only how the job is done but why it is done that way. The details on making up reservations, interline ticketing, and handling telephone inquiries are clearly explained for easy understanding and application.

14 informative chapters cover all phases of air transport

1. The City Ticket Office
2. Airline Ticketing and Routing
3. Air-travel Insurance
4. Reservations Procedure
5. Air Traffic Sales
6. The Airline Hostess
7. Airline Operations
8. The Airline Pilot—A Profession
9. The Airline Mechanic
10. Loading the Airplane
11. Air Mail
12. Air Express
13. Air Freight
14. Airline Publicity and Public Relations

See this book ten days FREE

McGraw-Hill Book Co.,
330 W. 42nd St., NYC 18

Send me Baker's AIRLINE TRAFFIC AND OPERATIONS for 10 days' examination on approval. In 10 days I will send $4.50 plus few cents postage, or return book postpaid. (We pay postage on cash orders.)

Name .....
Address .....
City and State .....
Company .....
Position AW-9-15-47
(For Canadian price write McGraw-Hill Co. of Canada Ltd., 12 Richmond Street E., Toronto 1)

EDITORIAL

A Demonstration of Integrity

Nothing is so difficult in commercial aviation as to concede publicly either that we have made mistakes, or that results have been below expectation.

The dependence of human life on our manufacturing industry's products has instilled in some of us the keenest reluctance to tell the public the truth when problems are most difficult.

In this industry we have a grapevine telegraph so speedy that rumors are born and flourish to nation-wide proportion overnight.

So we feel a glow of pride when one of our leading aircraft companies announces openly to its customers and the aviation press that it has found some of its products are below its own standards, and is setting out to do something about it before the rumor mill can start grinding out exaggerations.

Every aviation editor last week must have been as surprised as we were to receive a letter from John P. Gaty, vice president and general manager of Beech Aircraft Corp., telling why his company had decided to replace the wings on about 250 of the 800 Beech Bonanzas built to date. The wings of these 250 planes have the skin roll-welded to the stringers.

Mr. Gaty also enclosed a copy of the letter he is sending to each owner of a Bonanza, with a similar explanation.

No high-falutin' phraseology, no backtracking, no "victim of circumstances" attitude, no self-praise outlining the cost to the company in making these changes. We think the Beech explanation is worthy of reproducing here, as Mr. Gaty tells it to the aviation press. He says:

"When the Bonanza was first designed, one of our basic requirements was that the airplane should be able to give approximately 2,000,000 miles of safe operation without unusual maintenance expense. All-metal airplanes have long demonstrated the fact that their potential useful life is better than that of almost any other vehicle, measured in miles.

"In order to insure that the Bonanza fulfills these requirements, a very extensive fatigue testing program was carried through to completion prior to putting the Bonanza in production. No other airplane, either military or commercial, ever received such a thorough test as the Bonanza before quantity production. These tests extended over a year and indicated that the Bonanza would give at least 2,000,000 miles of safe and trouble-free operation except for the usual maintenance.

"During one of the most critical phases of our production acceleration we found ourselves short of automatic riveting capacity. In order to maintain production at the planned level, we made some experimental roll-welded skins and installed them on test wings. These tests indicated that the roll-welded skins were equally as good as the riveted skins. However, there was not time sufficient to accumulate a year of testing or a thousand hours in the air on any such unit. For that reason, the roll-welded skins did not receive the thorough testing that was imposed upon the riveted skins.

"Periodic inspections of some of the airplanes with the roll-welded skins have shown a minor and relatively unimportant crack in the vicinity of some of the weld spots. Although these cracks are of no structural significance at this time, they do indicate that the roll-welded skins will not stand up over the desired life of the airplane, on a par with the riveted skins. For that reason they are being replaced. We are making the change merely because each customer is entitled to the best possible airplane that we can deliver him for the price paid.

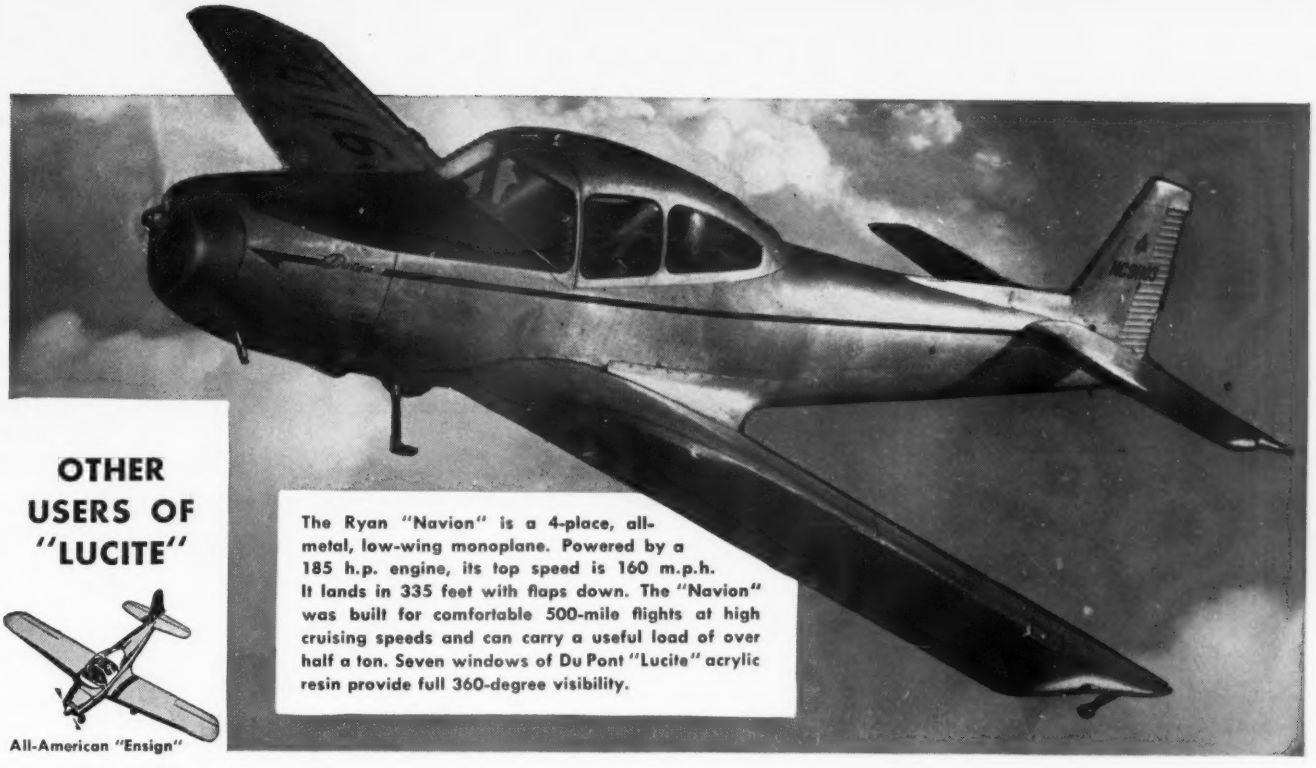
"Roll or spot welding will continue to be used on parts which are not subjected to the constant flexing that is imposed on wing structures by bumpy air. This method of fabricating structures is economical and efficient and helps to keep down the cost of metal airplanes.

"In order to stop any disturbing rumors—and as a matter of information—we also are sending letters explaining our action to all owners of Bonanzas having riveted wing skins.

"We know that you can handle this incident in a manner that will be beneficial to the entire aircraft industry. All modern U. S. airplanes are good products and are backed by an active regard for the customer's interests by the manufacturers of U. S. products."

If we were the owner of one of those 250 Bonanzas, we could hardly have any feeling but gratitude for the manufacturer, even though getting the ship back to the factory would be at our expense. We think Mr. Gaty's forthright handling of this problem is also a lesson for the rest of the aircraft industry.

ROBERT H. WOOD



The Ryan "Navion" is a 4-place, all-metal, low-wing monoplane. Powered by a 185 h.p. engine, its top speed is 160 m.p.h. It lands in 335 feet with flaps down. The "Navion" was built for comfortable 500-mile flights at high cruising speeds and can carry a useful load of over half a ton. Seven windows of Du Pont "Lucite" acrylic resin provide full 360-degree visibility.

OTHER USERS OF "LUCITE"

All-American "Ensign"

Beech "Bonanza"

Commonwealth "Skyranger"

Culver "Model V"

Funk "F-2-B"

Globe "Swift"

Meyers "Mac 125"

Piper "Super-cruiser"

Republic "Seabee"

The Ryan "Navion" Uses clear-vision "LUCITE"

Here's another outstanding plane with an enclosure of Du Pont "Lucite" acrylic resin. Just run over the list of advantages shown below to see why so many of the leading plane designers are using "Lucite." You'll understand why "Lucite" is used on so many of the finest American airplanes.

Write today for the free manual on "Lucite." It contains valuable information for aircraft designers, engineers, maintenance men and owners. E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Room 229, Arlington, New Jersey.

Tune in Du Pont "Cavalcade of America" Mondays, 8 P.M. EDT, NBC

FOR VISION—"LUCITE" transmits over 90% of light rays. Can be formed in one piece, eliminating ribs and blind spots.

FOR SERVICE—"LUCITE" stands up to the weather, hot or cold. Does not warp. In normal service, lasts for the life of the plane. "Lucite" is shatter-resistant, light in weight. Has good dimensional stability; resists vibration.

FOR INSTALLATION—"LUCITE" is easy to install and care for. It costs even less, in medium and greater thicknesses, than other plastics sometimes used.

DU PONT

REG. U. S. PAT. OFF.

Plastics

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

NOW... a fleet of flying labs

Several of these airplanes, shown in front of the G-E Flight-test Laboratory, are outfitted as flying laboratories. As such, they help test equipment ranging from jet engines and aircraft power systems to flight recorders and other specialized instruments. "Bugs"—inevitable in any new design—are caught and corrected in shorter time and at less expense than by other methods of testing. Results are reflected in better products at less cost to the user.

In 1942, several years before the G-E Flight-test Laboratory was built, General Electric started testing aircraft equipment with a B-23 rigged for turbosupercharger research. Since then we have operated, in co-operation with the Army Air Forces, about a dozen different flying laboratories—B-24's, B-29's, helicopters, and others.

When you specify G-E equipment, you know that you are getting equipment thoroughly tested. Our efforts here save you time, expense, and lives elsewhere. G-E specialists throughout the country will be glad to discuss our equipment with you—perhaps we can help you solve your electrical problems. *Aviation Divisions, Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

PRECISION PRODUCTS
AND
ENGINEERED SYSTEMS
FOR AIRCRAFT

GENERAL ELECTRIC

821-7